SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

SEMESTER: III

CATEGORY: BSC

SUBJECT CODE: BE-31

SUBJECT NAME: ENGINEERING MATHEMATICS
(PROBABILITY DISTRIBUTION AND STATISTICS)

COURSE OBJECTIVE: **[60Hrs]**

The objective of this course is to fulfill the needs of Engineers to understand the Applications of Fourier Series, Different Transforms, Complex Analysis & Vector Calculus in order to enable young technocrats to acquire Mathematical thinking of Formulating, Analyzing and Solving a wide range of Practical Problems Appearing in Science & Engineering.

UNIT I [12 Hrs]

Basic Probability: Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

UNIT II[12 Hrs]

Continuous Probability Distributions: Continuous random varibales and their properties, distribution functions and densities, normal, exponential and gamma densities.

Bivariate Distributions: Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes rule.

UNIT III[12 Hrs]

Basic Statistics: Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation

UNIT IV[12 Hrs]

Applied Statistics: Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

UNIT V[12 Hrs]

Small samples: Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

COURSE OUTCOMES:

Upon completion of this course, the students will get Analyzing and solving a wide range of Practical Problems

Textbooks/References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
3. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
4. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,2010.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

SEMESTER: III

CATEGORY: CORE

SUBJECT CODE: EI 31

SUBJECT NAME: SIGNALS AND SYSTEMS

COURSE OBJECTIVE: [60Hrs]

The objective of this course Understand the concepts of continuous time and discrete time systems, Signal properties: periodicity, absolute integrability, determinism and stochastic character. Some special signals of importance

UNIT I[12 Hrs]

Energy and power signals, continuous and discrete time signals, continuous and discrete amplitude signals. System properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, realizability.

UNIT II[12 Hrs]

Linear shift-invariant (LSI) systems, impulse response and step response, convolution, input-output behavior with aperiodic convergent inputs. Characterization of causality and stability of linear shiftinvariant systems. System representation through differential equations and difference equations.

UNIT III[12 Hrs]

Periodic and semi-periodic inputs to an LSI system, the notion of a frequencyresponse and its relation to the impulse response, Fourier series representation, the Fourier Transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase response, Fourier domain duality. The Discrete-Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). Parseval's Theorem.The idea of signal space and orthogonal bases.

UNIT IV[12 Hrs]

The Laplace Transform, notion ofeigen functions of LSI systems, a basis of eigen functions,

region of convergence, poles and zeros of system, Laplace domain analysis, solution to differential equations and system behavior.The z-Transform for discrete time signals and systems- eigen functions, region of convergence, z-domain analysis.

UNIT V[12 Hrs]

State-space analysis and multi-input, multi-output representation. The state-transition matrix and its role. The Sampling Theorem and its implications- Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold, and so on. Aliasing and its effects. Relation between continuous and discrete time systems.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to understand the concepts of continuous time and discrete time systems, analyse systems in complex frequency domain understand sampling theorem and its implications.

Text/Reference books:

1. A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems", Prentice Hall, 1983.

2. R.F. Ziemer, W.H. Tranter and D.R. Fannin, "Signals and Systems - Continuous and Discrete", 4th edition, Prentice Hall, 1998.

3. Papoulis, "Circuits and Systems: A Modern Approach", HRW, 1980.

4. B.P. Lathi, "Signal Processing and Linear Systems", Oxford University Press, c1998.

5.Douglas K. Lindner, "Introduction to Signals and Systems", McGraw Hill International Edition:c1999.

6. Simon Haykin, Barry van Veen, "Signals and Systems", John Wiley and Sons (Asia) Private Limited, c1998.

7. Robert A. Gabel, Richard A. Roberts, "Signals and Linear Systems", John Wiley and Sons, 1995.

8. M. J. Roberts, "Signals and Systems - Analysis using Transform methods and MATLAB", TMH,2003.

9. J. Nagrath, S. N. Sharan, R. Ranjan, S. Kumar, "Signals and Systems", TMH New Delhi, 2001.

10. Ashok Ambardar,"Analog and Digital Signal Processing", 2nd Edition, Brooks/ Cole Publishing Company (An international Thomson Publishing Company), 1999.

SEMESTER: III

CATEGORY: CORE

SUBJECT CODE: EI 32

SUBJECT NAME: ELECTRONICS DEVICES

COURSE OBJECTIVE: **[60Hrs]**

The objective of this course Semiconductor Physics, mathematical models of semiconductor junctions and MOS transistors for circuits and systems

UNIT -I[12 Hrs]

Introduction to Semiconductor Physics: Review of Quantum Mechanics, Electrons in periodic Lattices, E-k diagrams. Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility and resistivity; sheet resistance, design of resistors

UNIT -II[12 Hrs]

Generation and recombination of carriers; Poisson and continuity equation P-N junction characteristics, I-Vcharacteristics, and small signal switching models; Avalanche breakdown, Zener diode, Schottky diode. Schottky diode, Tunnel Diode, PIN diode.

UNIT -III[12 Hrs]

Applications of diode : diode as rectifier, clipper and clamper, The diode as a circuit element, The Load line concept, The Pieceswise linear diode modal, Clipping circuits, Clipping at two independent levels, Comparators, Sampling Gate, Rectifiers, Other full wave circuits, Capacitor filter additional diodes circuits.

UNIT -IV[12 Hrs]

Bipolar Junction Transistor, I-V characteristics, Ebers-Moll Model,MOS capacitor, C-V characteristics, MOSFET, I-V characteristics, and small signal models of MOS transistor, LED,photodiode and solar cell;

UNIT -V[12 Hrs]

Integrated circuit fabrication process: oxidation, diffusion, ion implantation, photolithography, etching, chemical vapor deposition, sputtering, twin-tub CMOS process.

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to

1. Understand the principles of semiconductor Physics
2. Understand and utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.

Text /Reference Books:

1. G. Streetman, and S. K. Banerjee, "Solid State Electronic Devices," 7th edition, Pearson,2014.
2. D. Neamen , D. Biswas "Semiconductor Physics and Devices," McGraw-Hill Education
3. S. M. Sze and K. N. Kwok, "Physics of Semiconductor Devices," 3rd edition, John Wiley &Sons, 2006.
4. C.T. Sah, "Fundamentals of solid state electronics," World Scientific Publishing Co. Inc, 1991.
5. Y. Tsividis and M. Colin, "Operation and Modeling of the MOS Transistor," Oxford Univ.Press, 2011.

List of Experiments:

All experiments (wherever applicable) should be performed through the following steps.

Step 1: Circuit should be designed/drafted on paper.

Step 2: The designed/drafted circuit should be simulated using Simulation Software

Step 3: The designed/drafted circuit should be tested on the bread board and compare the results with the simulated results.

Step 4: The bread board circuit should be fabricated on PCB by one batch using PCB machine.

1. V-I characteristics of various Diodes (p-n, Zener, Varactor, Schottky, Tunnel, Photodiode etc)
2. Application of diode as clamper , clipper, half wave and full wave rectifier.
3. Characteristics of Transistors (BJT and FET)
4. Study of Power electronic devices (MOSFET, IGBT etc).

SEMESTER: III

CATEGORY: CORE

SUBJECT CODE: EI 33

SUBJECT NAME: DIGITAL SYSTEM DESIGN

COURSE OBJECTIVE: [60Hrs]

The objective of this course Logic Simplification and Combinational Logic Design, Use HDL & appropriate EDA tools for digital logic design and simulation.

UNIT I[12 Hrs]

Logic Simplification and Combinational Logic Design: Review of Boolean algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms, Karnaugh maps up to 6 variables, Binary codes, Code Conversion.

UNIT II[12 Hrs]

Introduction to logic gates, Universal gate, MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display, Half and Full Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel shifter and ALU.

UNIT III[12 Hrs]

Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Rippleand Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts. Designing synchronous circuits like Pulse train generator, PseudoRandom Binary Sequence generator, Clock generation

UNIT IV[12 Hrs]

Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing, Memory elements, Concept of Programmable logic devices like FPGA. Logic implementation using Programmable Devices.

UNIT V[12 Hrs]

VLSI Design flow: Design entry: Schematic, FSM & HDL, different modeling styles in VHDL, Data types and objects, Dataflow, Behavioral and Structural Modeling, Synthesis and Simulation VHDL constructs and codes for combinational and sequential circuits.

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to

1. Design and analyze combinational logic circuits
2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, and Encoder
3. Design & analyze synchronous sequential logic circuits
4. Use HDL & appropriate EDA tools for digital logic design and simulation

Text/Reference Books:

1. R.P. Jain, Modern digital Electronics, Tata McGraw Hill, 4th edition, 2009.
2. Douglas Perry, VHDL, Tata McGraw Hill, 4th edition, 2002.
3. W.H. Gothmann, "Digital Electronics- An introduction to theory and practice", PHI, 2nd edition ,2006.
4. D.V. Hall, "Digital Circuits and Systems", Tata McGraw Hill, 1989
5. Charles Roth, "Digital System Design using VHDL", Tata McGraw Hill 2nd edition 2012.

LIST OF EXPERIMENT(Expandable):

All experiments (wherever applicable) should be performed through the following steps.

Step 1: Circuit should be designed/ drafted on paper.

Step 2: The designed/drafted circuit should be simulated using Simulation S/W (TINA-V7/ PSPICE/ Labview/ CIRCUIT MAKER).

Step 3: The designed/drafted circuit should be tested on the bread board and compare the results with the simulated results.

Step 4: The bread board circuit should be fabricated on PCB prepared on PCB machine.

1. To study and test of operation of all logic gates for various IC's

(IC#7400,IC#7403,IC# 7408,IC#74332,IC#7486).

2. Verification of Demorgan's theorem.
3. To construct of half adder and full adder
4. To construct of half subtractor and full subtractor circuits
5. Verification of versatility of NAND gate.
6. Verification of versatility of NOR gate.
7. Designing and verification of property of full adder.
8. Design a BCD to excess-3 code converter.
9. Design a Multiplexer/ Demultiplexer.

SEMESTER: III

CATEGORY: CORE

SUBJECT CODE: EI 34

SUBJECT NAME: NETWORK THEORY

COURSE OBJECTIVE: [60Hrs]

The objective of this course introduction to circuit elements R,L,C and their characteristics in terms of linearity & time dependant nature, Network function & Two port networks

UNIT I[12Hrs]

Introduction to circuit elements R,L,C and their characteristics in terms of linearity & time dependant nature, voltage & current sources controlled & uncontrolled sources KCL and KVL analysis, Nodal & mesh analysis, analysis of magnetically coupled circuits, Transient analysis :- Transients in RL, RC&RLC Circuits, initial conditions, time constants. Steady state analysis- Concept of phasor & vector, impedance & admittance, Network topology, concept of Network graph, Tree, Tree branch & link, Incidence matrix, cut set and tie set matrices, dual networks, Dot convention, coupling co-efficient, tuned circuits, Series & parallel resonance.

UNIT II [12Hrs]

Network Theorems for AC & DC circuits- Thevenins & Norton's, Superpositions, Reciprocity, Compensation, Substitution, Maximum power transfer, and Millman's theorem, Tellegen's theorem, problems with dependent & independent sources.

UNIT III [12Hrs]

Frequency domain analysis – Laplace transform solution of Integro-differential equations, transform of waveform synthesized with step ramp, Gate and sinusoidal functions, Initial & final value theorem, Network Theorems in transform domain

UNIT IV[12Hrs]

Concept of signal spectra, Fourier series co-efficient of a periodic waveform, symmetries as related to Fourier coefficients, Trigonometric & Exponential form of Fourier series.

UNIT V[12Hrs]

Network function & Two port networks – concept of complex frequency, Network & Transfer functions for one port & two ports, poles and zeros, Necessary condition for driving point & transfer function. Two port parameters – Z,Y, ABCD, Hybrid parameters, their inverse & image parameters, relationship between parameters, Interconnection of two ports networks, Terminated two port network.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

1. Apply network theorems for the analysis of electrical circuits.
2. Obtain the transient and steady-state response of electrical circuits.
3. Analyse circuits in the sinusoidal steady-state (single-phase and three-phase).
4. Analyse two port circuit behavior.

References:

1. M.E. Van Valkenburg, Network Analysis, (PHI)
2. F.F.Kuo, Network Analysis.
3. Mittal GK; Network Analysis; Khanna Publisher
4. Mesereau and Jackson; Circuit Analysis- A system Approach; Pearson.
5. Sudhakar & Pillai; Circuit & Networks- Analysis and Synthesis; TMH
6. Hayt W.H. & J.E. Kemmerly; Engineering Circuit Analysis; TMH
7. Decarlo lin; Linear circuit Analysis; Oxford
8. William D Stanley : Network Analysis with Applications, Pearson Education
9. Roy Choudhary D; Network and systems; New Age Pub
10. Charles K. Alexander & Matthew N.O. Sadiku: Electrical Circuits :TMH
11. Chakraborti :Circuit theory: Dhanpat Rai
12. B.Chattopadhyay & P.C.Rakshit; Fundamental of Electrical circuit theory; S Chand
13. Nilson & Riedel, Electric circuits ;Pearson

List of experiments (Expandable):

All experiments (wherever applicable) should be performed through the following steps.

Step 1: Circuit should be designed/ drafted on paper.

Step 2: The designed/drafted circuit should be

simulated using Simulation S/W (TINA-V7/ PSPICE/ Labview/ CIRCUIT MAKER).

Step 3: The designed/drafted circuit should be tested on the bread board and compare the results with the simulated results.

Step 4: The bread board circuit should be fabricated on PCB prepared on PCB machine.

1. To Verify Thevenin Theorem.
2. To Verify Superposition Theorem.
3. To Verify Reciprocity Theorem.
4. To Verify Maximum Power Transfer Theorem.
5. To Verify Millman's Theorem.
6. To Determine Open Circuit parameters of Two Port Network.
7. To Determine Short Circuit parameters of a Two Port Network.
8. To Determine A,B, C, D parameters of a Two Port Network
9. To Determine h parameters of a Two Port Network
10. To Find Frequency Response of RLC Series Circuit.
11. To Find Frequency Response of RLC parallel Circuit.

SEMESTER: III

CATEGORY: LC

SUBJECT CODE: BE 34

SUBJECT NAME: SOFTWARE LAB-I (JAVA PROGRAMMING)

COURSE OBJECTIVE: **[60Hrs]**

Objectives of the course The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, and appropriate framework for automated UNIT and integration tests.

UNIT I [12Hrs]

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

UNIT II [12Hrs]

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees.

Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections **Algorithms**: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

UNIT III [12Hrs]

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs,

Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, and Oracle

UNIT IV [12Hrs]

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT V[12Hrs]

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

COURSE OUTCOMES

After taking the course, students will be able to:

1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.

List of Program to be perform (Expandable)

1. Installation of J2SDK
2. Write a program to show Concept of CLASS in JAVA
3. Write a program to show Type Casting in JAVA
4. Write a program to show How Exception Handling is in JAVA
5. Write a Program to show Inheritance and Polymorphism
6. Write a program to show Interfacing between two classes
7. Write a program to Add a Class to a Package

8. Write a program to demonstrate AWT.
9. Write a program to hide a Class
10. Write a Program to show Data Base Connectivity Using JAVA
11. Write a Program to show “HELLO JAVA” in Explorer using Applet
12. Write a Program to show Connectivity using JDBC
13. Write a program to demonstrate multithreading using Java.
14. Write a program to demonstrate applet life cycle.

SEMESTER: III

CATEGORY: PDFS

SUBJECT CODE: BE35

SUBJECT NAME: PROFESSIONAL DEVELOPMENT FINISHING SCHOOL

LEVEL-I

36 HOURS

COURSE OBJECTIVE

The students are to be groomed with respect to personality development. In this regard, an effort is made to improve the knowledge with respect to basic in English, mathematics, aptitude and reasoning.

UNIT-I[12 Hrs]

Conversational English:

Grammar mainly Tenses, 100 small sentences of daily use tense wise, Letter Writing, Standard Format for CV writing.

UNIT-II[12 Hrs]

Basic Mathematics:

Arithmetic, Algebra, UNIT Conversions.

Arithmetic

Number system, Decimals, Fractions, Simplification, HCF and LCM. Ratio and proportion, percentage, partnership, Average, profit and Losses, Simple Interest and Compound Interest, Mensuration, Time and work ,Time and Distance, Data Interpretation , Trigonometry Basics ,etc.

Algebra

Basics Algebraic Formulae, Linear Equations, quadratics Eqations,Logarithms,Functions, Permutation and Combination, Binomial Theorem , Series (AP,GP,HP).UNIT conversion SI,FPS,MKS,CGS

UNIT-III[12 Hrs]

Aptitude / Reasoning

Quantitative Aptitude and Logical Reasoning- Level-1

Problem solving on.

Number System, problems on Ages, Number Theory, Algebra, Clocks and Calendars.

Alphabet Test, Series Completion, Coding- Decoding, Logical Sequence, Insert missing figures.

Course Outcome

The students have gained confidence after improving their English, Math, and Aptitude and reasoning abilities.

NATIONAL CADET CORPS

GROOMING TOMORROW'S LEADERS

OFFERING NCC A GENERAL GENERIC ELECTIVE CREDIT COURSE IN UNIVERSITIES UNDER CHOICE BASED CREDIT SYSTEM TO ALIGN WITH NEW EDUCATION POLICY 2020

CONTENTS

SECTIONI:NCC CREDIT COURSE DESIGN DOCOMENT

UNDER CHOICE BASED CREDIT SYSTEM AS GENERAL ELECTIVE FOR SENIOR DIVISION / SENIOR WING

1. **Preamble**. The National Cadet Corps (NCC) is governed by NCC Act 1948 and attendant NCC Rules. It functions under the Ministry of Defence and is headed by DGNCC. It is organised into 17 State Directorates each headed by an Additional/Deputy Director General. The aims of NCC are:-
   (a) To develop character, camaraderie, discipline, secular outlook, the spirit of adventure, sportsman spirit and ideals of selfless service amongst cadets by working in teams, honing qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.
   (b) To create a pool of organized, trained and motivated youth with leadership qualities in all walks of life, who will serve the Nation regard less of which career they choose.
   (c) To provide a conducive environment to motivate young Indians to choose the Armed Forces as a career.
2. **Purpose.** Currently NCC training is imparted as extra-curricular activity to volunteer students from recognized schools and colleges who enroll as cadets. NCC as a Credit Course is designed with an intent to transform NCC training into a curricular activity from an extra-curricular thereby providing academic credits to students undergoing NCC training along with other attended advantages to the cadets in the college/ university.
3. **Introduction to NCC Credit Course Design.** Institutional Training is the mainstay of NCC training and it is conducted at colleges and universities by Associate NCC Officers and Armed Forces personnel. The application of knowledge gained through institutional training is further honed or developed to a higher degree in NCC Camps. The Institutional Training syllabus comprises Common Subjects and Specialised Subjects (military component). NCC Credit Course is designed to offer Institutional Training of 330

Senior Wing /Division is over six semesters (three years), comprising 300 periods (excluding Camp), of which 120 periods are meant for theory with 108 credits and 180 periods for practical with 6 credits. Each period is counted as hour. The ratio between theory and practical in terms of number of hours of training is 5:6, but in terms of credits is 5:3, since as per CBCS two hours of practical is counted towards one period of training as against one hour for theory. In addition two separate courses have been designed for two Camps normally referred to as Annual Training Camps (ATC).

Training schedules planned for cadets ensure that the optimum benefits of the NCC organization reach maximum number of cadets. The main emphasis is on practical training which in consonance with theory is made to facilitate active participation of learner, better assimilation of knowledge, and proper development of various skills, strengthening of mind and body which is the bedrock of NCC training.

NCC GENERAL ELECTIVE CREDIT COURSE DESIGN SUMMARY					
Semester	**Credits Allocated**			**Total**	**Remarks**
	Theory	**Practical**	**Camp**		
Semester - I	**01**	**01**	**-**	**02**	
Semester - II	**01**	**01**	**-**	**02**	
Semester – III	**01**	**01**	**05**	**07**	**Credits of 1st Camp merged with 3rd Sem**
Semester – IV	**02**	**01**	**-**	**03**	
Semester – V	**01**	**01**	**05**	**07**	**Credits of 2nd Camp merged with 5th Sem**
Semester - VI	**02**	**01**	**-**	**03**	
Total	**08**	**06**	**10**	**24**	**Twenty-Four Credits**

INSTITUTIONAL TRG SYLLABUS

COMMON SUBJECTS				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**NCC General**	**06**	**-**	**06**
2	**National Integration**	**04**		**04**
3	**Drill**	**-**	**45**	**45**
4	**Weapon Training**	**-**	**25**	**25**
5	**Personality Development**	**25**		**25**
6	**Leadership**	**12**	**-**	**12**
7	**Disaster Management**	**13**		**13**
8	**Social Service & Community Development**	**08**	**39**	**47**
9	**Health & Hygiene**	**-**	**10**	**10**
10	**Adventure**	**01**		**01**
11	**Environmental awareness & conservation**	**03**		**03**
12	**Obstacle Training**	**-**	**09**	**09**
13	**General Awareness**	**04**		**04**
14	**Border & Coastal Areas**	**06**		**06**
TOTAL HOURS COMMON SUBJECTS(a)		**82**	**128**	**210**

SPECIALSED SUBJECTS (ARMY)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practical**	
1	**Armed Forces**	**09**	**-**	**09**
2	**Map Reading**	**-**	**24**	**24**
3	**Communications**	**03**	**03**	**06**
4	**Infantry Weapons**	**03**	**03**	**06**

5	**Field Craft & Battle Craft**		**22**	**22**
6	**Military History**	**23**	**-**	**23**
Total Hours		**38**	**52**	**90**

SPECIALSED SUBJECTS (NAVY)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**Naval Orientation**	**12**	**-**	**12**
2	**Naval Communication**	**02**	**18**	**20**
3	**Navigation**	**02**	**03**	**05**
4	**Seamanship**	**15**	**18**	**33**
5	**Fire Fighting and Damage Control**	**04**	**03**	**07**
6	**Ship and Boat Modelling**	**03**	**10**	**13**
Total hours		**38**	**52**	**90**

SPECIALISED SUBJECTS (AIR FORCE)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**General Service Knowledge**	**08**	**-**	**08**
2	**Air Campaign**	**06**	**02**	**08**
3	**Principles of flight**	**06**	**06**	**12**
4	**Airmanship**	**01**	**07**	**08**
5	**Navigation**	**05**	**-**	**05**
6	**Aeroengines**	**06**	**-**	**06**
7	**Basic flight Instruments**	**03**	**03**	**06**
8	**Aero modelling**	**03**	**34**	**37**
Total Hours		**38**	**52**	**90**

INSTITUTIONAL TRAINING: TOTAL HOURS & CREDITS

INSTITUTIONAL TRAINING: TOTAL HOURS & CREDITS			
ITEM	Periods (1 hour duration each)		Total
	Lectures/Tutorials	Practicals	
TOTAL HOURS COMMON SUBJECTS	82	128	210
TOTAL HOURS SPECIALISED SUBJECTS(ARMY/NAVY/AIR FORCE)	38	52	90
TOTAL HOURS INSTITUTIONAL TRAINING	120	180	300
TOTAL CREDITS INSTITUTIONAL TRAINING	08 CREDITS (15 HOUR THEORY = 1 CREDIT POINT)	6 CREDITS (30 HOURS PRACTICAL TRAINING = 1 CREDIT POINT)	

NCC CAMP TRAINING SYLLABUS

COMMON SUBJECTS				
S No.	**Subjects**	**Periods**		**Total**
		L/T	**P**	
1.	Physical Training	-	18	18
2.	Drill	-	32	32
3.	Weapon Training	08	28	36
4.	National Integration and Awareness	08	-	08
5.	Personality Development	08	12	20
6.	Leadership	08	-	08
7.	Disaster Management	08	-	08
8. .	Social Service and Community Development	-	08	08
9.	Health & Hygiene	08	-	08
10.	Obstacle Training	-	04	04
11.	Military History	04	-	04
12.	Communication	04	-	04
13.	Games	-	18	18
14.	Culture	-	18	18
	TOTAL	**56**	**138**	**194**
SPECIALISED SUBJECTS				
1.	Map Reading	-	24	24
2.	Infantry Weapons	04	02	06
3.	Field Craft & Battle Craft	-	16	16
	TOTAL	**04**	**42**	**46**
	GRAND TOTAL	**60 (4 credit)**	**180 (6 credit)**	**240 (10 credit)**

NCC CAMP TRAINING SYLLABUS (FOR THEORY)

Ser No	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Weapon Training	-	-	04	-	04	-	08
2.	National Integration & Awareness	-	-	04	-	04	-	08
3.	Personality Development	-	-	04	-	04	-	08
4.	Leadership	-	-	04	-	04	-	08
5.	Disaster Management	-	-	04	-	04	-	08
6.	Health & Hygiene	-	-	04	-	04	-	08
7.	Military History			02		02		04
8.	Communication			02		02		04
9.	Infantry Weapons	-	-	02	-	02	-	04
	TOTAL	-	-	30	-	30	-	60
	TOTAL Credit	-	-	2	-	2	-	4

NCC CAMP TRAINING SYLLABUS (FOR PRACTICAL)

Ser No	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Physical Training	-	-	09	-	09	-	18
2.	Drill	-	-	16	-	16	-	32
3.	Weapon Training	-	-	14	-	14	-	28
4.	Personality Development	-	-	06	-	06	-	12
5.	Social Service and Community Development	-	-	04	-	04	-	08
6.	Obstacle Training	-	-	02	-	02	-	04
7.	Games			09		09		18
8.	Culture			09		09		18
9.	Map Reading	-	-	12	-	12	-	224
10.	Infantry Weapons	-	-	01	-	01	-	02
11.	Field Craft & Battle Craft	-	-	08	-	08	-	16
	TOTAL			**90**		**90**		**180**
	TOTAL CREDIT			**03**		**03**		**06**

SEMESTER WISE COURSE DESIGN ARMY CADETS

INSTITUTIONAL TRAINING: SEMESTER WISE DISTRIBUTION OF NCC SYLLABUS FOR THEORY(ARMY CADETS)

S. NO.	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	NCC General	06	-	-	-	-	-	06
2.	National Integration	04	-	-	-	-	-	04
3.	Personality Development	02	05	05	04	06	04	25
4.	Leadership	-	05	04	03	-	-	12
5.	Disaster Management	-	-	03	10	-	-	13
6.	Social Service & Community Development	03	05	-	-	-	-	08
7.	Adventure	-	-	01	-	-		01
8.	Environmental Awareness & Conservation	-	-	-	03	-		03
9.	General Awareness	-	-	-	04	-		04
10.	Border & Coastal Areas	-	-	02	-	02	02	06
11.	Armed Forces	-	-	-	06	-	03	09
12.	Infantry Weapons	-	-	-	-	3	-	3
13.	Communication	-	-	-	-	-	03	03
14.	Military Hospital	-	-	-	-	04	19	23
	TOTAL	15	15	15	30	15	30	120
	TOTAL Credit	1	1	1	2	1	2	08

INSTITUTIONAL TRAINING: SEMESTER WISE DISTRIBUTION OF NCC SYLLABUS FOR PRACTICAL (ARMY CADETS)

S. NO.	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Drill	12	12	08	07	03	03	45
2.	Field Craft & Battle Craft	03	04	04	04	04	03	22
3.	Map Reading	03	05	04	04	04	04	24
4.	Weapons Training	05	04	04	04	04	04	25
5.	Communication	-	-	-	-	-	03	03
6.	Infantry Weapons	-	-	-	-	-	03	03
7.	Social Service & Community Development	07	05	05	06	06	10	39
8.	Health & Hygiene	-	-	-	05	05	-	10
9.	Operation Training	-	-	05	-	04		09
	TOTAL	30	30	30	30	30	30	180
	TOTAL Credit	01	01	01	01	01	01	06

INSTITUTIONAL TRAINING: SEMESTER WISE THEORY DETAILED SYLLABUS (ARMY CADETS)

SEMESTER I					
S.No	Subject	Periods	Chapter	Lesson	Hours
1	NCC General	6	NCC-I	Aims, Objectives and Org of NCC	1
			NCC-II	Incentives	2
			NCC-III	Duties of NCC Cadets	1
			NCC-IV	NCC Camps: Types and Conduct	2
2	National Integration and Awareness	4	NI-I	National Integration: Importance and Necessity	1
			NI-II	Factors affecting National Integration	1
			NI-III	Unity in Diversity	1
			NI-IV	Threats to National Security	1
3	Personality Development	2	PD - I	Factors Self-Awareness Empathy Critical and Creative Thinking Decision Making and Problem Solving	2
4	Social Service and Community Development	3	SSCD - I	Basics of Social Service Rural Development Programmes NGO's Contribution of Youth	3
				TOTAL HOURS	**15**
				TOTAL CREDITS	**1**

SEMESTER II					
S.No	Subject	Periods	Chapter	Lesson	Hours
5	Personality Development	5	PD-II	Communication Skills	3
			PD-III	Group Discussion -Coping with Stress and Emotions	2
6	Leadership	5	L-I	Leadership Capsule Traits Indicators Motivation Moral Values Honour Code	3
			L-II	Case Studies Shivaji, Jhansi Ki Rani,	2
7	Social Service and Community Development	5	SS-IV	Protection of Children & Women Safety	1
			SS-V	Road/Rail Travel Safety	1
			SS-VI	New Initiatives	2
			SS-VII	Cyber and Mobile Security Awareness	1
				TOTAL HOURS	**15**
				TOTAL CREDITS	**1**

SEMESTER III					
S.No	Subject	hours	Chapter	Lesson	HOURS
8	Personality Development	5	PD-III	Group Discussions - Change your Mindset	2
			PD-V	Public Speaking	3
9	Leadership	4	L-II	Case Studies – APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy	4
10	Disaster Management	3	DM-I	Disaster Management Capsule Organisation Types of Disasters Essential Services Assistance Civil Defence Organisation	3
11	Adventure	1	AD-I	Adventure activities	1
12	Border & Coastal Areas	2	BCA-I	History, Geography & Topography of Border/ Coastal Areas	2
TOTAL HOURS					**15**
TOTAL CREDITS					**1**

SEMESTER IV					
S.No	Subject	hours	Chapter	Lesson	HOURS
13	Personality Development	4	PD-III	Group Discussions - Time Management, Social Skills	4
14	Leadership	3	L-II	Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war	3
15	Disaster Management	9	DM-II	Initiative Trg, Organising Skills, Dos and Don'ts Natural Disasters Man Made Disasters	9
		1	DM-III	Fire Services and Fire Fighting	1
16	Environmental Awareness	3	EA-I	Environmental Awareness and Conservation	3
17	General Awareness	4	GA-I	General Awareness	4
18	Armed Forces	6	AF-1	Army, Navy, Air Force and Central Armed Police Forces	6
TOTAL HOURS					30
TOTAL CREDITS					2

SEMESTER V					
S.No	Subject	hours	Chapter	Lesson	HOURS
19	Personality Development	6	PD-III	Group Discussions - Team Work	2
			PD-V	Public Speaking	4
20	Border & Coastal Areas	2	BCA-II	Security Setup and Border/Coastal management in the area	2
21	Introduction to Infantry Battalion and its Equipments	3	INF-1	Organisation of Infantry Battalion & its weapons	3
22	Military History	4	MH-3	Study of Battles of Indo-Pak Wars 1965 & 1971	4
TOTAL HOURS					15
TOTAL CREDITS					1

SEMESTER VI					
S.No	Subject	hours	Chapter	Lesson	HOURS
25	Personality Development	3	PD-IV	Career Counselling, SSB Procedure and Interview Skills	3
27	Border & Coastal Areas	2	BCA-III	Security Challenges & Role of cadets in Border management	2
28	Armed Forces	3	AF-2	Modes of Entry into Army, Police and CAPF	3
29	Military History	19	MH-1	Biographies of Renowned Generals	6
			MH-2	War Heroes : Param Veer Chakra Awardees	3
			MH-3	Study of Battles of Kargil	2
			MH-4	War Movies	8
30	Communication	3	C-1	Introduction to Communication & Latest Trends	3
TOTAL HOURS					30
TOTAL CREDITS					2

SIX SEMESTER NCC COURSE SYLLABUS

Training Objectives: Institutional Training

1. Institutional training includes basic military training of the cadets as part of the curriculum with its long-standing effort to mould young volunteers into disciplined and responsible citizens of India. NCC course is aimed to achieve following learning objectives:-

   (a) Develop character, camaraderie, discipline, secular outlook, the spirit of adventure, sportsman spirit and ideals of selfless service amongst cadets by working in teams, honing qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.

   (b) To create interest in cadets by including and laying emphasis on those aspects of Institutional Training which attract young cadets into the NCC and provides them an element of thrill and excitement.

   (c) To inculcate defence Services work ethos that is characterized by hard work, sincerity of purpose, honesty, ideal of selfless service, dignity of labour, secular outlook, comradeship, spirit of adventure and sportsmanship.

   (d) To create a pool of organized, trained and motivated youth with leadership qualities in all walks of life, who will serve the Nation regardless of which career they choose.

   (e) To provide conducive environment to motivate young Indians to choose the Armed Forces as a career.

SEMESTER I COURSE MODULE : NATIONAL CADET CORPS I

National Cadet Corps : Course Details			
Course Title: National Cadet Corps I			
Course Code	**BNCC01GE03**	**Credits**	**1(Thr)+ 1(Pr) = 03**
L /T + P	**15+30**	**Course Duration**	**1 Semester**
Semester	**I (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e, 25% internal assessment and 75% end term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

2. **Course Objectives:** Cadets will be able to: -

(a) Know about the history of NCC, its organization, and incentives of NCC for their career prospects.

(b) Acquire knowledge of duties and conduct of ncc cadets.

(c) Understand about different NCC camps and their conducts.

(d) Understand the concept of national integration and its importance.

(e) Understand the concept of self-awareness and emotional intelligence.

(f) Understand the concept of critical & creative thinking.

(g) Understand the process of decision making & problem solving.

(h) Understand the concept of team and its functioning.

(i) Understand the concept and importance of Social service.

3. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Imbibe the conduct of NCC cadets.

(b) Respect the diversity of different Indian culture.

(c) Practice togetherness and empathy in all walks of their life.

(d) Do their own self analysis and will workout to overcome their weakness for better performance in all aspects of life.

(e) Understand creative thinking & its components.

(f) Think divergently and will try to break functional fixedness.

(g) Make a team and will work together for achieving the common goals.

(h) Do the social services on different occasions.

4. Course Content Part (I) Theory

(a) **Unit 1- NCC General (N) (Contact Hrs. 06)**. Introduction of NCC, History, Aims, Objective of NCC & NCC as Organization, Incentives of NCC, Duties of NCC Cadet. NCC Camps: Types & Conduct.

(b) **Unit 2-National Integration & Awareness (NI) (Contact Hrs. 04)** . National Integration: Importance & Necessity, Factors Affecting National Integration, Unity in Diversity & Role of NCC in Nation Building, Threats to National Security.

(c) **Unit 3- Personality Development (Contact Hrs. 3)**. Intra & Interpersonal skills - Self-Awareness-&Analysis, Empathy, Critical & creative thinking, Decision making and problem solving.

(d) **Unit 4- Social Service and Community Development(Contact Hrs. 02)**. Basics of social service and its need, Types of social service activities, Objectives of rural development programs and its importance, NGO's and their contribution in social welfare, contribution of youth and NCC in Social welfare.

Course Content Part (II) Practical

5. **Course Objectives:** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of foot drill.

(c) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(d) Develop awareness about different types of terrain and how it is used in battle craft.

(e) Develop the concept of various markings on the map and how they are co-related to the ground features.

(f) Understand the various social issues and their impact on social life.

(g) Develop the sense of self-less social service for better social & community life.

6. **Expected Learning Outcomes:** After completing this course, the cadets will be able to: -

(a) Perform foot drill and follow the different word of command.

(b) Fire a weapon effectively with fair degree of marksmanship.

(c) Undertake point to point navigation and take part in route marches by day and night.

(d) Perform the social services on various occasions for better community & social life.

7. Course Content Part (II) Practical

(a) **Unit 1. Drill (Contact Hrs. 12)**. Foot Drill- Drill ki Aam Hidayaten, Word ki Command, Savdhan, Vishram, Aram Se, Murdna, Kadvar Sizing, Teen Line Banana, Khuli Line, Nikat Line, Khade Khade Salute Karna Parade Par, Visarjan, Line Tod, Tej Chal, Tham aur Dhire Chal, Tham.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 05)**. Introduction & Characteristics of .22 rifle, Handling of .22 rifle.

(c) **Unit 3. Map Reading (MR) (Contact Hrs. 03)**. Definition of Map, Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Magnetic Variation and Grid Convergence.

(d) **Unit 4. Field Craft & Battle Craft (FC & BC) (Contact Hrs. 03)**. Introduction of Field Craft & Battle craft, Judging Distance, Method of Judging Distance.

(e) **Unit 5. Social Service and Community Development (SSCD)(Contact Hrs.07)**.Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc.

SEMESTER II COURSE MODULE : NATIONAL CADET CORPS II

Course Title: National Cadet Corps II			
Course Code	**BNCC02GE03**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15+30**	**Course Duration**	**1 Semester**
Semester	**II (Even)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

8. **Course Objectives:** Cadets will be able to: -

(a) Understand the thinking & reasoning process.

(b) Understand the process to cope with Stress & emotions.

(c) Understand the importance of improving communication skills.

(d) Identify the leadership traits.

(e) Admire the qualities of great leaders.

(f) Know about different legal provisions for children & women safety and protection.

(g) Understand the various rules & measures to be taken to ensure Road/Rail safety.

(h) Understand & spread awareness about latest Government initiatives for welfare of citizens and contribute towards Nation building.

(i) Understand concepts of cyber and mobile security.

9. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Define thinking, reasoning, critical thinking and creative thinking.

(b) To think critically about different life related issues.

(c) Think divergently and will try to break functional fixedness.

(d) Creatively in their real-life problems.

(e) Understand the organizations related to disaster management and theirfunctioning.

(f) Appreciate the role of NCC cadets in disaster management.

10. Course Content Part (I) Theory

(a) Unit 1. Personality Development (Contact Hrs.5)

(i) Thinking- Meaning and Concept of thinking, Reasoning, Process of thinking.

(ii) Critical Thinking- Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking.

(iii) Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.

(b) Unit 2. Leadership Development (Contact Hrs.5)

(i) Leadership capsule.

(ii) Important Leadership traits, Indicators of leadership and evaluation.

(iii) Motivation- Meaning & concept, Types of motivation. Factors affecting motivation.

(iv) Ethics and Honor codes.

(c) Unit 3. Social Service and Community Development (Contact Hrs. 5)

(i) Protection of Children & Women Safety.

(ii) Road/Rail Safety.

(iii) New Government Initiatives.

(iv) Cyber and mobile Security Awareness.

Course Content Part (II) Practical

11. **Course Objectives**. Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of foot drill.

(c) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(d) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

12. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Perform foot drill gracefully.

(b) Give and follow the different word of command.

(c) Fire a weapon effectively with fair degree of marksmanship.

(d) Use of bearing and service protractor and locate the places and objects on the ground.

(e) Do the social service and feel connected with social problems.

13. Course Content Part (II) Practical

(a) Unit 1. Drill (Contact Hrs. 12)

(i) Foot Drill Dahine, Baen, Aageaur Piche Kadam Lena.

(ii) Tej Chal se Murdna, Tej Chal se Salute Karna, Tej Kadam Taal aur Tham, Tej Kadam Taal se Kadam Badalna.

(iii) Teeno Teen se Ek File aur ek file se Teeno Teen Banana

(b) Unit 2.Weapon Training(Contact Hrs. 04)

(i) Range procedure & Theory of group.

(ii) Short Range firing.

(c) Unit 3. Map Reading(Contact Hrs. 05)

(i) Protractor Bearing and its conversion methods.

(ii) Service protractor and its uses.

(iii) Prismatic compass and its uses and GPS.

(iv) Navigation by compass and GPS.

(d) Unit 4. Field Craft & Battle Craft (Contact Hrs. 04)

(i) Indications of landmarks and Targets.

(ii) Intro, Definitions, Types of Ground, Indication of Landmarks, Methods of iden of targets, difficult targets.

(e) **Unit 5.Social Service and Community Development(Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and state level.

SEMESTER III COURSE MODULE : NATIONAL CADET CORPS III

COURSE TITLE: NATIONAL CADET CORPS III			
Course Code	**BNCC03GE02**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15 +30**	**Course Duration**	**1 Semester**
Semester	**III (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

14. **Course Objectives**. Cadets will be able to: -

(a) Understand the life history and leadership qualities of great leaders, sportspersons & entrepreneurs.

(b) Understand the various aspects of types of mindset.

(c) Understand public speaking methods &qualities.

(d) Understand the organizations related to disaster management and their functioning.

(e) Understand the role of NCC cadets in disaster management.

(f) Understand the various types of adventure activities.

(g) Understand the History, Geography & Topography of Border/ Coastal Areas.

15. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Admire and get inspired from the accomplishments of leaders from various walks of life.

(b) Develop public speaking skills.

(c) Understand the importance of positive mindset and optimistic attitude in life.

(d) Appreciate the need & requirement for disaster management and his role in disaster management activities.

(e) Know the history & geographical peculiarity of our borders & coastal regions.

16. Course Content Part (I) Theory

(a) Unit 1. Personality Development (Contact Hrs.5)

(i) Group Discussions - Change your Mindset

(ii) Public Speaking.

(b) **Unit 2. Leadership Development (Contact Hrs.4)**.Case Studies– APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy.

(c) Unit 3. Disaster management(Contact Hrs. 3)

(i) Disaster Management Capsule.

(ii) Organisation.

(iii) Types of Disasters.

(iv) Essential Services.

(v) Assistance.

(vi) Civil Defence Organisation.

(d) **Adventure (Contact Hrs. 1)**.Adventure activities.

(e) **Border & Coastal Areas(Contact Hrs. 2)**. History, Geography & Topography of Border/ Coastal Areas.

Course Content Part (II) Practical

17. **Course Objectives**. Cadets will be able to : -

(a) Understand that drill as the foundation for discipline and to command a group for common goal

(b) Appreciate grace and dignity in the performance of arm drill

(c) Understand the concept and importance of social service.

(d) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(e) Actively participate in social service and community development activities.

18. **Expected Learning Outcomes**.After completing this course, the cadets will be able to: -

(a) Perform arm drill gracefully.

(b) Give and follow the different word of command.

(c) Fire a weapon effectively with fair degree of marksmanship.

(d) Different positioning for fire and aiming.

(e) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(f) Observe surroundings in better way.

(g) Develop the qualities of patience and confidence and become better individuals.

(h) Will develop physical as well as mental fitness.

19. Course Content Part (II) Practical

(a) Unit 1. Drill(Contact Hrs. 08)

(i) Arm Drill.

(ii) Rifle ke saath Savdhan, Vishram aur Aram se.

(iii) Rifle ke saath Parade Par aur Saj, Rifle ke saath Visarjan, Line Tod.

(iv) Bhumi Shastra aur Uthao Shastra, Bagal Shastra aur Baju Shastra.

(b) **Unit 2. Weapon Training(Contact Hrs. 04)**. Short Range firing.

(c) **Unit 3. Map Reading (Contact Hrs. 04)**.

(i) Setting of Map.

(ii) Findings North and Own Position.

(d) Unit 4. Field Craft & Battle Craft (Contact Hrs. 04)

(i) Observation.

(ii) Camouflage.

(iii) Concealment.

(e) **Unit 5. Social Service and Community Development (Contact Hrs. 05)**. Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) Unit 6. Obstacle Training(Contact Hrs. 05)

(i) Obstacle training - Introduction, Safety-measures, Benefits.

(ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall.

SEMESTER IV COURSE MODULE : NATIONAL CADET CORPS IV

Course Title: National Cadet Corps IV			
Course Code	BNCC04GE03	Credits	2(Thr)+ 1(Pr)=03
L /T + P	30+30	Course Duration	1 Semester
Semester	IV (Even)	Contact Hours	30(Thr)+30(Pr)=60Hours
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

20. **Course Objectives**. Cadets will be able to: -

(a) Develop a sense of time management and social skills.

(b) Understand the life history & leadership qualities of personalities who have contributed in Nation Building and Literature.

(c) Understand the role of NCC cadets as 2nd line Defence in 1965 War.

(d) Develop awareness about various types of Natural and manmade disasters.

(e) Know about life saving tips during disasters.

(f) acquainted about Fire Services.

(g) Understand importance of Environmental Awareness & conservation.

(g) Understand importance of General Awareness.

(h) Know about Armed Forces.

(b) **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(i) Effectively Manage time.

(ii) Develop the qualities of social skills.

(iii) Imbibe leadership qualities.

(iv) Do group discussions effectively.

(v) Be motivated to serve the nation by joining Armed forces.

(vi) Contribute in environmental awareness and conservation activities.

(vii) Keep abreast of current affairs & general awareness. (viii)Effectively contribute in managing disaster relief tasks.

21. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.4)**. Group Discussions – Social Skills & Time management.

(b) **Unit 2. Leadership Development (Contact Hrs.3)**.Case Studies – Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war.

(c) Unit 3. Disaster management(Contact Hrs. 10)

(i) Initiative Trg, Organising Skills.

(ii) Dos and Don'ts.

(iii) Natural Disasters.

(iv) Man Made Disasters.

(v) Fire Services and Fire Fighting.

(d) **Environmental Awareness (Contact Hrs. 3)**. Adventure Environmental Awareness and Conservation.

(e) **General Awareness (Contact Hrs. 4)**. General Awareness.

(f) **Armed Forces(Contact Hrs. 6)**.Army, Navy, Air Force and Central Armed Police Forces.

Course Content Part (II) Practical

22. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Understand various signals to convey messages in the army.

(c) Get acquainted various section formations.

(d) Understand the basics of personal and public hygiene.

(e) Get acquainted with the procedure to treat the wounds and fractures during emergencies.

23. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform weapon drill gracefully.

(b) Give and follow the different word of command.

(c) Appreciate grace and dignity in the performance of foot drill.

(d) Apply signals in there day to day functioning.

(e) Provide first aid during the emergencies.

(f) Navigate to the given location on ground using compass and GPS.

(g) Practice healthy practices for the personal sanitation and hygiene.

24. Course Content Part (II) Practical

(a) Unit 1. Drill (Contact Hrs. 08)

(i) Arm Drill.

(ii) Salami Shastra.

(iii) Squad Drill with Arms.

(b) **Unit 2. Weapon Training (Contact Hrs. 04)**. Short Range firing

(c) Unit 3. Map Reading(Contact Hrs. 04)

(i) Map to Ground.

(ii) Ground to Map.

(d) Unit 4. Field Craft & Battle Craft(Contact Hrs. 04)

(i) Fire and Move Capsule.

(ii) Field signal- with hand, with Weapons, Signal with Whistle.

(iii) Field signals as means of giving orders.

(iv) Field signals by day, Field signals by night.

(v) Section Formation.

(e) **Unit 5. Social Service and Community Development(Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) Unit 6. Health &Hygiene(Contact Hrs. 05)

(i) Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene).

(ii) First Aid in common medical emergencies.

(iii) Treatment & Care of Wounds.

SEMESTER V COURSE MODULE : NATIONAL CADET CORPS V

Course Title: National Cadet Corps V			
Course Code	**BNCC05GE02**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15 +30**	**Course Duration**	**1 Semester**
Semester	**V (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

25. **Course Objectives**. Cadets will be able to: -
    (a) Understand the concept of Team and its functioning.
    (b) Hone Public speaking skills.
    (c) Understand the security set up amd management of Border/Coastal areas.
    (d) Acquire knowledge about an Infantry Battalion organisation and its weapons.
    (e) Acquire knowledge about Indo-Pak Wars fought in 1965 & 1971.

26. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -
    (a) Participate in team building exercise and value team work.
    (b) Improve communication skills by public speaking activities.
    (c) Understand the security mechanism and management of Border/Coastal areas.
    (d) Get motivated to join armed forces.

27. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.6)**.

(i) Group Discussions –Team work.

(ii) Public speaking.

(b) **Unit 2. Border & Coastal Areas(Contact Hrs.2)**. Security Setup and Border/Coastal management in the area.

(c) **Unit 3. Introduction to Infantry Battalion and its Equipment(Contact Hrs. 3)**.

Organisation of Infantry Battalion & its weapons

(d) **Military History(Contact Hrs. 4)**. Study of Battles of Indo-Pak Wars 1965 & 1971.

Course Content Part (II) Practical

28. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of ceremonial drill.

(c) Use the compass and GPS to locate places on the ground and map.

29. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform ceremonial drill and follow the different word of command.

(b) Do the social service on various occasions and get connected with the community.

(c) Do all the asana and gain the physical& mental fitness.

30. Course Content Part (II) practical

(a) Unit 1. Drill(Contact Hrs. 03)

(i) Ceremonial Drill.

(ii) Guard Mounting.

(b) Unit 2. Field Craft & Battle Craft(Contact Hrs. 04)

(i) Fire control orders.

(ii) Types of fire control orders.

(iii) Fire and Movement- when to use fire and movements tactics, Basic considerations, Appreciation of ground cover, Types of cover, Dead ground, Common Mistakes, Map and air photography, Selection of Fire position and fire control.

(c) **Unit 3. Map Reading(Contact Hrs. 04)**.Google Maps & applications

(d) **Unit 4. Weapon Training(Contact Hrs. 04)**.Short Range firing

(e) **Unit 5. Social Service and Community Development (Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and State level.

(f) Unit 6. Health & Hygiene(Contact Hrs. 05)

(i) Yoga- Introduction, Definition, Purpose, Benefits.

(ii) Asanas-Padamsana, Siddhasana, Gyan Mudra, Surya Namaskar, Shavasana, Vajrasana, Dhanurasana, Chakrasana, Sarvaangasana, Halasana etc.

(f) Unit 7. Obstacle Training(Contact Hrs. 05)

(i) Obstacle training – Intro, Safety measures, Benefits.

(ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall etc.

SEMESTER VI COURSE MODULE : NATIONAL CADET CORPS VI

Course Title: National Cadet Corps VI			
Course Code	**BNCC06GE03**	**Credits**	**2(Thr)+ 1(Pr)=03**
L /T + P	**30 +30**	**Course Duration**	**1 Semester**
Semester	**VI (Even)**	**Contact Hours**	**30(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

31. **Course Objectives**. Cadets will be able to: -

(a) Get acquainted about counselling process its need and importance.

(b) Know about SSB procedure and different tasks and tests.

(c) Know about the conduction during the interview.

(d) Understand the security challenges & role of cadets in Border Areas.

(e) Know about the modes of entry in Armed forces, CAPF & police.

(f) Understand the life history & leadership qualities of great generals.

(g) Learn about 1999 Kargil war.

(h) Acquire the knowledge about various wars and their heroes.

(i) Know about various components of communication process.

32. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Get motivated to join Armed forces, police & CAPF.

(b) Write their CV effective and appealing.

(c) Face SSB interview effectively in their future.

(d) Understand individaul responsibilities & role in meetings the security challenges on Border/Coastal areas.

(e) Imbibe the feeling of patriotism.

(f) Communicate more effectively.

33. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.3)**.

(i) Career Counselling.

(ii) SSB Procedure.

(iii) Interview Skills.

(b) **Unit 2. Border & Coastal Areas(Contact Hrs.2)**. Security Challenges & Role of cadets in Border management.

(c) **Unit 3. Armed Forces(Contact Hrs. 3)**. Modes of Entry into Army, Police and CAPF.

(d) **Military History(Contact Hrs. 19)**.

(i) Biographies of Renowned Generals.

(ii) War Heroes : Param Veer Chakra Awardees.

(iii) Study of Battles of Kargil.

(iv) War Movies.

(e) **Communication(Contact Hrs. 3)**.Introduction to Communication & Latest Trends.

Course Content Part (II) Practical

34. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of ceremonial drill.

(c) Know about various knots and lashing used in soldiering.

(d) Acquire awareness about the basic weapon system in use in the Armed Forces.

35. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform foot drill and follow the different word of command.

(b) Aiming range and figure targets.

(c) Use the different knots and lashing in day-to-day life for different purposes.

(d) Develop the feeling of altruism.

36. **Course Content Part (II) Practical**.

(a) **Unit 1. Drill (Contact Hrs. 03)**.

(i) Ceremonial Drill.

(ii) Guard of Honour.

(b) **Unit 2. Weapon Training(WT) (Contact Hrs. 04)**.Short Range firing.

(c) **Unit 3. Map Reading(MR) (Contact Hrs. 04)**. Google maps and Applications.

(d) **Unit 4. Field Craft & Battle Craft(FCBC) (Contact Hrs. 03)**. Knots, Lashing and Stretchers.

(e) **Unit 5. Social Service and Community Development(SSCD) (Contact Hrs. 05)**. Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) **Unit 6 Introduction of Infantry Weapons &Equipment(INF) (Contact Hrs.03)**. Characteristics of 5.56MM INSAS Rifle, Ammunition, Fire Power, Stripping, Assembling & Cleaning Practice.

(g) Unit 7. Communication (COM) (Contact Hrs. 03).

(i) Basic Radio Telephony (RT) Procedure.

(ii) Introduction, Advantages, Disadvantages, Need for standard procedures.

(iii) Types of Radio telephony communication.

(iv) Radio telephony procedure, Documentation.

COURSE MODULE: NATIONAL CADET CORPS CAMP -I

Course Title: National Cadet Corps Camp I			
Course Code	**BNCCCAMP03GE05**	**Credits**	**2(Thr)+ 3(Pr)=05**
L /T + P	**30+90**	**Course Duration**	**10 Days (24 hours each)**
Semester	**III (Odd)**	**Contact Hours**	**30(Thr)+90(Pr)=120Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

37. **Course Objectives**.Cadets will be able to: -

(a) Acquire knowledge about the various aspects of personality development.

(b) Understand the concept of leadership traits, moral values and character traits.

(c) Develop awareness about the various types of natural disasters.

(d) Develop sensitivity to the changing environment and understand the importance of conservation.

(e) Understand the importance of hygiene and sanitation and common first aid procedures.

(f) Acquire awareness about various types of weapon systems in the Armed Forces.

38. **Expected Learning Outcomes**.After completing this course, the cadets will be able to: -

(a) Acquire adequate skill sets to overcome their weakness and reshape their personality.

(b) Imbibe good moral values and character traits in their daily life.

(c) Become useful members of the society and form part of disaster response team, if need arises.

(d) Respect and make efforts to conserve natural resources

(e) Follow good personal hygiene practices and provide first aid in emergencies.

(f) Be motivated to join the armed forces.

39. NCC Camp-I : Course Content Part (I) Theory

(a) **Unit 1. Personality Development (PD) (Contact Hrs. 04)**. Introduction to Personality Development, Factors influencing/shaping personality, Time Management and Interview Skills.

(b) **Unit 2. Leadership (LDR) (Contact Hrs. 04)**. Leadership Traits, Moral Values and Character Traits.

(c) **Unit 3. Disaster Management (DM) (Contact Hrs. 04)**. Assistance during natural disasters, Do's and Don'ts forNCC Cadets performing Disaster Management Duties

(d) **Unit 4. National Integration and Awareness (NIA)(Contact Hrs. 04)**. Water Conservation and Rain Harvesting, Waste Management an Energy Conservation

(e) **Unit 5. Health and Hygiene (H&H)(Contact Hrs. 04)**. Hygiene and Sanitation, First Aid in Common Medical Emergencies.

(f) **Unit 6. Infantry Weapons (IW) (Contact Hrs. 02)**. Characteristics of Company Support Weapons.

(g) Unit 7. Weapon Training (WT) (Contact Hrs. 04). Characteristics of Point 22 Rifle and its Ammunition, Range Procedure and Safety Precautions**.**

(h) **Unit 8. Military History (MH) (Contact Hrs. 04)**. Guest lectures by War Veterans/decorated soldiers/veterans.

(i) **Unit 9.Communication (COM) (Contact Hrs. 04)**. Basics of communication.

NCC Camp-I : Course Content Part (II) Practical

40. **Course Objectives**. Cadets will be able to: -

(a) Understand that drill is the foundation of discipline and command a group for a common goal.

(b) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(c) Develop awareness about different types of terrain and how it is used in Battle Craft.

(d) Develop the concept of various markings on the map and how they are co-related to the ground features.

(e) Acquire awareness about the various types of weapon systems in the Armed Forces.

(f) Understand the concept and importance of social service.

(g) Understand the various nuances of Personality Development.

(h) Understand the concept and importance of Physical Training in everyone's life.

(i) Acquire skill sets about various games and understand the importance of team work.

(j) Develop awareness about different cultures and different modes of its projection in artistic forms.

41. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Perform foot drill, arms drill, ceremonial drill and will be able to give out different words of command.

(b) Fire a weapon effectively with fair degree of marksmanship.

(c) Undertake point to point navigation and take part in route marches by day and night.

(d) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(e) Be motivated to join the armed forces.

(f) Acquire adequate skill sets to overcome their weakness and enhance their personality.

(g) Gain adequate physical and mental endurance capabilities.

(h) Play team games and be able to communicate and coordinate effectively in group events or situations.

(i) Respect the diversity of Indian culture and develop pride by showcasing their own culture to others.

42. NCC Camp-I : Course Content Part (II) Practical

(a) **Unit 1. Drill (Drill)(Contact Hrs. 16)**. Drill ki Aam Hidayaten aur Words of Command, Savdhan, Vishram, Aram Se aur Mudna, Khuli Line aur Nikat Line mein march, Salute Karna Parade Par, Visarjan aur Line Tod, Tej Chal, Tham aur Dhire Chal, Tham, Dahine, Baen, Aage aur Piche Kadam lena, Tejchaal se Mudna, Tejchaal se Salute karna, Tej kadamtaal aur Tham, Tej Kadamtaal se kadam badhana, Teenon Teen se ek file Banana aur ek file se Teenon Teen Banana, Rifle Ke Saath Saavdhan, Vishram aur Aaram se, Rifle ke saath Parade par aur saaj, Rifle Ke saath

visarjan aur line tod, Bhumi Sashtra aur Uthao Sashtra, Bagal Sashtra aur Baaju Shastra.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 14)**. Stripping, Assembling, Cleaning of Point 22 rifle, Sight Setting and Sight Picture of Point 22 Rifle, Loading, Cocking and Unloading, Lying Position, Holding and Aiming of Point 22 rifle, Trigger Control and Firing of Shot, Theory of Group, Short-Range Aiming and Firing, Firing Practice I to VII.

(c) **Unit 3. Field Craft & Battle Craft (FC/BC) (Contact Hrs. 06)**.Introduction of Field Craft & Battle craft, Judging Distance, Indication of Landmarks and Targets, Observation, Camouflage and Concealment, Field Signals, Section formations.

(d) **Unit 4. Map Reading (MR) (Contact Hrs. 12)**. Introduction to Map and Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Types of Bearing and use of Service Protector, Prismatic Compass and its use, setting of a map, Finding North and own Position, Map to Ground and Ground to map, Point to Point march, Route March – I, Route March -II.

(e) **Unit 5. Infantry Weapons (IW) (Contact Hrs. 01)**. Characteristics of Battalion Support Weapons.

(f) **Unit 6. Social Service and Community Development (SSCD) (Contact Hrs. 04)**. Basics of Social Service and its need, Rural Development Programme, Civic Responsibilities: Cadets will participate in various activities throughout the camp e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc., Road /Rail Travel Safety

(g) **Unit 7. Personality Development (PD) (Contact Hrs. 06)**.Self-Awareness, Empathy, Critical and Creative Thinking, Decision making and problem Solving, Coping with Stress and Emotions, Time Management.

(h) **Unit 8. Obstacle Training (OT) (Contact Hrs. 02)**. OT Practice – I:- Untimed, Cadets will be familiarized with all the obstacles in the Obstacle Course and briefed about the correct method to do them, OT Practice -II: Timed practice for all the cadets and record to be maintained.

(i) **Unit 9. Physical Training (PT) (Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in morning hours. Training has to be progressive in degree of difficulty to improve individual stamina and endurance. Training to include warming up, running, exercises to strengthen upper body, lower body and core muscles. Two period each to be devoted to route march by day and night respectively and one period will be earmarked for trekking expedition as part of Adventure Activity.

(j) **Unit 10. Games Training (G)(Contact Hrs. 09)**. Games Training will be carried out on each day of

the camp, except on last day, in evening hours. Training has to be progressive in degree of difficulty to improve individual skills, coordination, team work and desire to excel. Training to ensure that each and every boy and girl cadets participate in at least one game activity everyday.

(k) **Unit 11. Cultural Activity (C)(Contact Hrs. 09)**. Cultural Activity will be carried out on each day of the camp, except on last day, in evening hours. Cadets have to divided in Nine Groups consisting of a mix of boy and girl cadets and preferably belonging to the same geographical area. Each group has to present the unique culture, custom, tradition, folk lore, songs, drama, paintings and cuisine during one hour allotted. There will be a prize for the best group to encourage participation and to develop pride in their unique culture. This training activity should ensure that each and every boy and girl cadet participate in at least one game activity every-day.

(l) **Unit 12. Spare (S)(Contact Hrs. 02)**. Two periods in each camp will be earmarked as spare to cover disruptions in training activity due to weather or other administrative reasons.

COURSE MODULE : NATIONAL CADET CORPS CAMP – II

Course Title: National Cadet Corps Camp II			
Course Code	**BNCCCAMP05GE05**	**Credits**	**2(Thr)+ 3(Pr)=05**
L /T + P	**30+90**	**Course Duration**	**10 Days (24 hours each)**
Semester	**V (Odd)**	**Contact Hours**	**30(Thr)+90(Pr)=120Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (II) Theory

43. **Course Objectives**.Cadets will be able to: -

(a) Acquire the concept self-awareness, emotional intelligence, critical and creative thinking, decision making and problem solving.

(b) Learn about various indicators of good leadership and get an insight on principle of leadership and motivation.

(c) Develop awareness about the various types of natural disasters and disaster management organization in our country.

(d) Familiarize with natural resources, changing environment and understand the importance of conservation and waste management.

(e) Value the importance of Physical and Mental health and understand how to deal with wounds of various types.

(f) Acquire awareness about organization and role of an Infantry Battalion in the Armed Forces.

44. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Develop a sense of responsibility, smartness in appearance and improve self-confidence, inculcate importance of empathizing with others, improve their deep-thinking ability and apply ideas and be able to face problems in a constructive manner with solutions.

(b) Imbibe good leadership traits and apply them in practical life and appreciate the visible outcome of leadership and motivation.

(c) Appreciate role of the org during emergency and become useful members of disaster response team, if need arises.

(d) Learn about the various natural resources, their utilization and practice method of conservation of these resources in daily life.

(e) Appreciate value of physical and mental health in daily life and spread awareness about treatment and care of wounds in their society.

(f) Be motivated to join the armed forces.

45. **NCC Camp-II : Course Content Part (I) Theory**.

(a) **Unit 1. Personality Development (PD) (Contact Hrs. 04)**.Self-Awareness, Emotional intelligence, Critical and Creative Thinking, Decision-Making and Problem Solving.

(b) **Unit 2. Leadership (LDR) (Contact Hrs. 02)**. Indicators of Good Leadership, Leadership and Motivation.

(c) **Unit 3. Disaster Management (DM) (Contact Hrs. 02)**. Disaster Management Organization NDMA and NDRF, Types of Disasters.

(d) **Unit 4. Environmental Awareness and Conservation (EAC) (Contact Hrs. 02)**. Natural Resources, Conservation and Management, Water Conservation, Waste Management, Energy Conservation.

(e) **Unit 5. Health and Hygiene (H&H) (Contact Hrs. 02)**. Physical and Mental Health, Treatment and Care of Wounds.

(f) **Unit 6. Infantry Weapons (IW) (Contact Hrs. 01)**. Organization of Infantry Battalion.

(g) **Unit 7. Weapon Training (WT) (Contact Hrs. 02)**. Characteristics of Point 22 Rifle and its Ammunition, Range Procedure and Safety Precautions.

(h) **Unit 8. Military History (MH) (Contact Hrs. 04)**. Guest lectures by War Veterans/decorated soldiers/veterans.

(i) **Unit 9. Communication (COM) (Contact Hrs. 04)**. Latest trends in communication.

NCC Camp-II : Course Content Part (II) Practical

46. **Course Objectives**. Cadets will be able to: -

(a) Inculcate spirit of discipline and follow command as a group for a common goal.

(b) Fire a weapon with adequate safety precautions necessary for safe firing.

(c) Understand the lay of the ground and use it skillfully towards own objective.

(d) Understand and use the map, satellite imagery and GPS effectively.

(e) Identify and be well versed with the primary weapom systems used in the Armed Forces.

(f) Lead a life of selflessness and provide service towards society development and nation building.

(g) Understand the importance of changing mindset, team work, social skills etiquettes and manners, interview skills and importance of effective communication in daily life.

(h) Learn the importance of physical fitness and nuances of physical training.

(i) Inculcate esprit-de-corps through team games.

(j) Have knowledge about cultural diversity of India and learn ways and means to adopt them.

47. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Practice problem solving, critical thinking in real life situations.

(b) Practice leadership of small teams and groups under challenging environment.

(c) Develop a positive attitude, have manners and etiquettes in social life, develop a sense of cooperation for group or team work, participate in an interview with confidence and inculcate verbal and non-verbal communication skills.

(d) Develop adequate physical and mental endurance capabilities.

(e) Fire a weapon effectively with fair degree of marksmanship.

(f) Undertake point to point navigation and take part in endurance marches by day and night.

(g) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(h) Be motivated to join the Armed Forces.

(i) Play team games and be able to communicate and coordinate effectively in group events or situations.

(j) Perform foot drill, arms drill, ceremonial drill and will be able to take part in ceremonial parade and events.

(k) Respect the diversity of indian culture and develop pride by showcasing their own culture to others.

48. NCC Camp-II : Course Content Part (II) Practical

(a) **Unit 1. Drill (Drill) (Contact Hrs. 16)**. Tejchaal se Mudna, Tejchaal se Salute karna, Tej kadamtaal aur Tham, Tej Kadamtaal se kadam badhana, Teenon Teen se ek file Banana aur ek file se Teenon Teen Banana, Rifle Ke Saath Saavdhan, Aaram se, Rifle ke saath Parade par aur saaj, Rifle Ke saath visarjanaur line tod, Bhumi Sashtra aur Uthao Sashtra, Bagal Sashtra aur Baaju Shastra, Salami Sashtra, Squad Drill, Guard Mounting, Guard of Honour, Platoon / Company Drill, Word of Command and Instructional Practice.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 14)**. Stripping, Assembling, Cleaning of Point 22 rifle, Sight Setting and Sight Picture of Point 22 Rifle, Loading, Cocking and Unloading, Lying Position, Holding and Aiming of Point 22 rifle, Trigger Control and Firing of Shot, Theory of Group, Short-Range Aiming and Firing, Musketry Training, Firing Practice I to VII.

(c) **Unit 3. Field Craft & Battle Craft (FC/BC) (Contact Hrs. 06)**. Observation, Camouflage and Concealment, Field Signals, Section formations, Fire Control Orders, Fire and Movement, Knots and Lashings.

(d) **Unit 4. Map Reading (MR) (Contact Hrs. 12)**. Introduction to Map and Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Types of Bearing and use of Service Protector, Prismatic Compass and its use, setting of a map, Finding North and own Position, Map to Ground and Ground to map, Point to Point march, Endurance March – I (10 KM), Endurance March -II (20 KM).

(e) **Unit 5. Infantry Weapons (IW) (Contact Hrs. 01)**. Characteristics of Infantry Company support weapons and 5.56 MM INSAS Rifle.

(f) **Unit 6. Social Service and Community Development (SSCD)(Contact Hrs. 04)**. Contribution of Youth Towards Social Welfare: Cadets will participate in various activities throughout the camp e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc., Social Evils: Female Feticide, Dowry, Child Abuse, Trafficking and Corruption, Drug Abuse and Drug Trafficking, Protection of Children and POCSO Act 2012.

(g) **Unit 7. Personality Development (PD)(Contact Hrs. 06)**. Change Your Mindset, Team Work and Team Building, Social Skills, Etiquettes and Manners, Interview Skills, Communication Skills–I, Communication Skills -II

(h) **Unit 8. Obstacle Training (OT)(Contact Hrs. 02)**. OT Practice – I: Untimed, Cadets will be familiarized with all the obstacles in the Obstacle Course and briefed about the correct method to do them, OT Practice -II: Timed practice for all the cadets and record to be maintained.

(i) **Unit 9. Physical Training (PT) (Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in morning hours. Training has to be progressive in degree of difficulty to improve individual stamina and endurance. Training to include warming up, running, exercises to strengthen upper body, lower body and core muscles. Two period each to be devoted to route march by day and night respectively and one period will be earmarked for trekking expedition as part of Adventure Activity.

(j) **Unit 10. Games Training (G)(Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in evening hours. Training has to be progressive in degree of difficulty to improve individual skills, coordination, team work and desire to excel. Training to ensure that each and every boy and girl cadets participate in at least one game activity everyday

(k) **Unit 11. Cultural Activity (C) (Contact Hrs. 09)**. Cultural Activity will be carried out on each day of the camp, except on last day, in evening hours. Cadets have to divided in Nine Groups consisting of a mix of boy and girl cadets and preferably belonging to the same geographical area. Each group has to present the unique culture, custom, tradition, folk lore, songs, drama, paintings and cuisine during one hour allotted. There will be a prize for the best group to encourage participation and to develop pride in their unique culture. This training activity should ensure that each and every boy and girl cadets participate in at least one game activity every day (Contact Hrs. 09)

(l) **Unit 12. Spare (S) (Contact Hrs. 02)**. Two periods in each camp will be earmarked as spare to cover disruptions in training activity due to weather or other administrative reasons.

SECTION II : RULES AND REGULATIONS

GOVERNING NCC CREDIT COURSE UNDER CHOICE BASED CREDIT SYSTEM AS GENERIC ELECTIVE FOR SENIOR DIVISION/WING

RULE 1 :Definitions of Key Terms

General Definitions

'Choice Based Credit System' (CBCS).The CBCS provides choice for the student to select courses from the prescribed courses (Elective or Soft – Skill courses). It provides a 'Cafeteria' approach in which the students can take courses of their choice, learn at their own pace, study additional courses and acquire more than the minimum required credits, and adopt an inter-disciplinary approach.

'Academic Year'.Two consecutive (one odd + one even) semesters shall constitute one academic year.

'Credit Course'.Course, usually referred to as paper having specific title and code number, is a component of a programme. It consists of a list of topics/concepts/theories/principles/activities/tasks etc. which a student has to learn during the programme of study. Each course has some credits according to the nature and load of content. Each course should define the learning objectives/learning outcomes. A course may be designed to be delivered through lectures/tutorials/laboratory work/field work/out reach activities/project work / vocational training / physical training /viva / seminars /term papers / assignments / presentations / self-study work etc., or a combination of some of these.

'Course Instructor/Teacher'.The course instructor generally will be a teaching faculty who has taken up the responsibility of teaching it and evaluating the performance of the students in that course. NCC course will be imparted by the ANO (Associate NCC Officer) and PI (Permanent Instructor) / Girl Cadet Instructor (GCI) staff together according to their area of specialization. Certain specific topics and training activity is imparted by Military Officers and Whole Time Lady (WTLO).

'Credit'.A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work per week. Thus, in each semester's NCC course, credits are assigned on the basis of the number of lecture/tutorial/field work/physical training/excursions and other forms of learning required for completing the contents in a 15-18 week schedule. 2 hours of laboratory work/field work is generally considered equivalent to 1 hour of lecture.

i. 1 credit = 1 hour of instruction per week (1 credit course = 15 contact hours of instruction per

semester)

ii. 4 credit = 4 hour of instruction per week (4 credit course = 60 contact hours of instruction per semester)

iii. 1 credit = 2 hour of practical per week (1 credit course = 30 contact hours of instruction per semester)

iv. 4 credit = 8 hour of practical per week (4 credit course = 120 contact hours of instruction per semester)

Number(s) of credit(s) assigned to a particular course are mentioned in the detailed syllabus of the courses.

'Credit Point'.It is the product of the grade point and the number of credits for a course.

'Letter Grade'.It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P, and F. A letter grade is assigned to a student on the basis of evaluation of her/his performance in a course on a ten-point scale.

'Grade Point'.It is a numerical weight allotted to each letter grade on a 10 -point scale.

Letter Grade	Grade Point
O	9-10
A+	8-9
A	7-8
B+	6-7
B	5-6
C	4-5
P	4
F	0
Ab	0

Note : University may use the above said criteria for providing the grades to the students or may adopt the same criteria which they are practicing for providing the letter grade and grade point for other subjects.

'Programme'.An educational programme leading to the award of degree, Diploma or Certificate course. NCC course shall be offered only at under graduate level programmes for any stream or type of programme

for example – Nonprofessional courses BA, B.SC. B. Com etc. professional courses – B.A., LLB, B.A./B.Sc., B.Ed., BCA, BBA, B. Tech, MBBS etc.

'Credit – Based Semester System (CBSS)'.Under the CBSS, the requirement of awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.

'Semester'.Each semester shall consist of 15 to 16 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June. The Credit-based semester system provides flexibility in designing curriculum and assessing credits based on the course content and hrs of teaching.

'Semester Grade-Point Average (SGPA)'. Semester Grade Point Average or SGPA, is an average grade point earned by the student at the end of an academic session i.e. semester at college. The formula for calculation of SGPA is the sum of all the credit points awarded for the subjects divided by total credits allotted to that semester. It shall be expressed up to two decimal places.

'Cumulative Grade Point (CGPA)'. It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all the semesters. It shall be expressed up to two decimal places.

'Transcript/ Grade card or certificate'. Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade and / or marks secured) along with SGPA of semester. Overall Grade Certificate will be issued on completion of the course showing semester wise SGPA & CGPA.

'The University/ College/ Institution'. The University/ College/ Institution in present document means the any recognized central/ state/ Deemed university or institution meant for higher education.

'NCC Course'. In the present document 'NCC Course' means the course designed for imparting NCC curriculum in educational institutions as elaborated in this document under Choice Based Credit System as a General Elective Course for Senior Division/ Senior Wing.

Definitions Specific to NCC

'Institutional Training'. Implies training conducted for NCC cadets as per Training Manuals and Cadet Hand Book issued by DG NCC, Ministry of Defence.

'Common Subjects'. Implies those subjects specifically taught in NCC curriculum which are common to Army, Navy and Air Force and general training that can be imparted by Associate NCC Officers or Military staff or a suitably qualified person.

'Specialised Subjects'. Implies subjects specifically taught in NCC curriculum by military instructors comprising specialised topics for Army, Navy and Air Force Cadets respectively.

'NCC Camps and Centralised Training Events'. Collective training events conducted usually for 10

days with large number of cadets living under field conditions in selected places away from home. The training camp comprises of focused physical and mental training routines of different types as per syllabus and curriculum. Some training like route marches may happen overnight. Camps include, adventure camps, national integration camps, Republic Day Parade Training Camps, ThalSainik, VayuSainik and NauSaink camps and other outdoor training activities as described in DG NCC Training Manuals.

NCC 'B' and 'C' Certificate Examinations. These are defined in Special National Cadet Corps Order 2020 issued by DG NCC, Ministry of Defence.

'Training Faculty'.Persons suitably trained & responsible for imparting training of different types and nature to students.

'Military Officers'. They are regular commissioned officers of Indian Armed Forces who serve in the NCC and render command, administrative and instructional functions for NCC.

'Whole Time Lady Officers (WTLO)'. They are women officers commissioned directly into the NCC.

'Associate NCC Officer (ANO)'. ANO will be a university/ college/ school faculty who are qualified in the PRCN (Pre-commission Course of NCC) conducted by DGNCC and are commissioned as Associate Officers in NCC as defined in NCC Act 1948 and NCC Rules. They have the eligibility to impart certain component of NCC Course and undertake training of cadets.

'Permanent Instructor (PI)'. PI Staff are Junior Commissioned Officers (JCO) and Non-Commissioned Officers (NCO) on deputation from Armed Forces to NCC as governed by NCC Act 1948. Retired PI Staff may be hired by a college as a substitute for ANO with prior concurrence of DGNCC.

'Girl Cadet Instructors (GCI)'. GCI are lady instructors' equivalent to PI Staff for specifically imparting instructions to women NCC cadets of Senior Wing.

'NCC Organizational Structure'. NCC is an adjunct of Indian Armed Forces that operates under the ambit of the Ministry of Defence through the Defence Secretary with Raksha Mantri as the political head.

'DGNCC'.Directorate General of NCC renders the command and administrative function of NCC. The executive head of NCC is Director General of NCC who is a Lt Gen rank officer from the Army.

'State NCC Directorate'. State NCC Directorates are directorates subordinate to DG NCC and render command and administrative control to NCC at State level and is headed by an Additional or Deputy Director General

'NCC Group HQ'. NCC Group HQs are subordinate to State Directorates and render command and administrative control to NCC at district or cluster of districts in a state and is headed by a Group Commander.

'NCC Units'. NCC Units are subordinate to Group HQs at the lowest rung of the command and administrative control exercised by military officers and is headed by a Commanding Officer or Officer

Commanding. The NCC Units directly engage with educational institutions and ANOs and are primarily responsible for training of NCC in institutions under their jurisdiction.

'NCC Division/ Wing'. NCC Division/Wing are minor units of senior division/wing of NCC comprising of 160 senior cadets allotted to educational institutions. It can be further subdivided into NCC platoons of 53 to 54 cadets.

'NCC Troop'. NCC Troop are minor units of junior division/wing of NCC comprising of 100 junior cadets allotted to educational institutions. It can be further subdivided into NCC half troops comprising of 50 junior cadets.

RULE 2 : Admission and Other Provisions

The NCC Course under the CBCS as 'General Elective' shall be of three years (Six Semester) duration which may be completed in maximum duration of four year (8 semesters).

Students may complete NCC course minimum in Six semesters and maximum in eight semesters. Cadets may complete their 'B' Certificate in four semesters minimum and maximum six semesters. Cadets already having 'B' certificate may complete their 'C' certificate in minimum two semesters and maximum four semesters, and they may join NCC course 5 in first semester of college.

The intake to the course shall be decided according to the seats allotted to University/ college/ institution by DG NCC according to the availability of required infrastructure, faculty and resources.

The admission to the NCC Course under the CBCS as a 'General Elective' shall be governed by the provisions as laid down by the NCC Act 1948/ SNCCO 2020/ contemporary SNCCO and Academic council of parallel body of university. These rules and regulations may be modified from time to time (if needed) by the Academic body of the university in consultation with DG NCC or Act/ Ordinances prepared by DG NCC.

Students will be enrolled as NCC cadet as per existing Acts & Rules.

At the time of reporting for admission, the candidates are required to present medical & physical fitness documents as well as the admission proof of the university and submit the self-attested copies of aforesaid documents.

The admission of any candidate is liable to be cancelled without giving any further notice forthwith or at any time during the period of the course, if it is detected that the candidate has/had produced fake/forged certificate (s)/ document(s), indulged in any act of misconduct/indiscipline and has/had concealed any other relevant information at the time of admission.

The admission of the candidate to the course shall be subject to such ordinance, rules and regulations as may be framed from time to time by the university in consultation with DG NCC and NCC act 1948.

DG NCC shall have jurisdiction in case of any dispute relating to the provisional admission in the course.

RULE3 : For Eligibility, Medium of Instrs & Categories

Eligibility Conditions. Be governed by provisions of NCC Act and Rules and directions from DG NCC from time to time. These are readily available on DG NCC website www.nccindia.nic.in.

Standards for physical Fitness criteria for Male and Female Cadets/students shall be governed by provisions of NCC Act and Rules and policy documents released by DG NCC from time to time.

RULE4 : Medium of Instruction. English or Hindi. However, ANOs and training instructors are free to use vernacular language for helping students who are not fluent in Hindi or English.

RULE 5 : Course and Students. NCC course is unique, due to the nature of its military training content and component hence it is normally offered to students enrolled as NCC cadets only. This NCC Course is primarily designed for students enrolled as NCC cadets under provisions of NCC Act 1948. Institution allotted NCC will have the obligation to offer this course to all students from their institute enrolled as cadets as per vacancy allotted to the institution by DG NCC as also to those cadets enrolled under Open Quota seats.

RULES 6 :NCC Course for 'Cadet' Category 6.1. NCC Course for 'Cadet'

(a) NCC course for Cadets comprises of total 24 credits (08 for theory, 06 for practical and 10 for camp component) over 6 semesters courses i.e., NCC course I to NCC course VI and NCC Camp I & NCC Camp II.

(b) Cadets will not only earn the academic credits but also be given 'B', and 'C' Certificates after passing the exam conducted by DG NCC.

(c) Students would be free to join NCC Course I or subsequent Courses in any semester, not necessarily Semester I or the designated Semester.

(d) A student can opt for only one of the six Courses per semester and that too sequentially implying NCC Course II cannot be joined before completing NCC Course I and so on.

(e) Under this category a fresh student/cadet will compulsorily have to opt for all six NCC Courses in minimum six Semesters. However, 'B' certificate holder may directly join NCC Course Number 5 in any semester. He will have to complete NCC Course Number 5 and NCC Course Number 6 for

obtaining ‘C’ certificate and he will be awarded credit points only for NCC Course Number 5 and NCC Course Number 6.

NCC GENERAL ELECTIVE CREDIT COURSE DESIGN SUMMARY					
Semester	Credits Allocated			Total	Remarks
	Theory	Practical	Camp		
Semester - I	1	1		2	
Semester - II	1	1		2	
Semester – III	1	1	5	7	Credits of 1st Camp merged with 3rd Sem
Semester – IV	2	1		3	
Semester – V	1	1	5	7	Credits of 2nd Camp merged with 5th Sem
Semester - VI	2	1		3	
Total	08	6	10	24	Twenty-Four Credits

RULE 7 :Mobility& Credit Bank

The mobility shall be permissible from the regular mode programme to the regular mode programme of learning only and cannot be replaced by open/distance/online programme.

It shall be the responsibility of the student to assess the feasibility and practicality of vertical mobility (across the Universities), as it doesn't entitle a student to be exempted or relaxed from any of the requisites (sessional, attendance, assignments, End-semester examinations and programme duration etc.) for completing the course.

After completing one semester/ one year cadet/student may pursue NCC course from any other institution/ University/ College having NCC and carry credits in credit bank as per NEP 2020. The NCC students/ Cadets of some other university shall in any case be admitted only at the beginning of the session to the fulfilment of the other requirements of the NCC Course (attendance, Formative assessment, Field-work, practical etc).

A student of NCC course availing inter-university mobility shall continue to be a bonafide student of the university where he/she initially got admission and as per the university/ Institutional rules for the inter-university mobility.

In case of inter-university mobility of NCC cadet for NCC Course is also the subject to availability of NCC for the cadets in that particular university/ institution and it shall be interpreted as inter-battalion migration (means another regimental no. shall be allotted to the cadet).

RULE 8 :Examination & Promotion

The examination of all the NCC courses shall be internal in nature and generally consisting of continuous internal assessment and End of semester Examination. For the preparation of final grade in a particular course, the continuous internal assessment (Formative in nature) and the End Semester Examination (Summative in nature) shall have the weightage as decided for other courses by the university as per the University norms for e.g., 25% internal assessment and 75% End of term exams or 30% internal assessment and 70% End of term exams etc.

For assigning the Grades and credit points to NCC Course Universities/ Institutions are free to use the same criteria which are decided by their academic bodies for providing the grades and credit points to the other courses

RULE 9 :Continuous Internal Assessment

The Continuous Internal Assessment of the NCC Cadets' and NCC students' learning and performance shall be carried out by the ANOs and PI staff.

Continuous Internal Assessment will be 100% Practical that includes Drill Square test, Map Reading, Weapon Training, Field craft & Battle craft.

CO of nominated NCC Unit will be deemed as Head of the Department and shall be responsible for approving the schedule and pattern of the continuous internal examination.

ANO of the nominated institute shall maintain all the records related to attendance, teaching and assessment in a systematic manner, including award of final grade.

In case a student fails to appear in any Continuous Internal Assessment, they will be given a chance to reappear in retest and in case he/she fails to obtain 'P' grade he/she will be made to repeat the exam by carrying it forward for semester retest .

RULE 10 :Re-appear in the End Semester Examination for Improvement of Grades

If a student wishes to improve her/his grade(s) in NCC course(s), she/he can re-appear in the End Semester Examination in the subsequent odd/even semester(s), whenever the examination of the particular course(s) is held, on payment of fees in addition to the prescribed semester fee within the maximum permissible duration for the programme of study of the student/cadet.

A student may improve her/his points/grade by reappearing in the End Semester Examination of a course as per the provisions of reappearing mentioned above. In such cases points obtained by the student in the Continuous Internal Assessment of the particular course shall be carried forward to the subsequent End Semester Examination of the course. However, in such case, the points/grades obtained on the basis of latest appeared End Semester Examination shall be considered for calculation of final CGPA of the programme.

The re-appear examination of a course for improvement of grade shall be based on the syllabi of the course in force at the time of initial registration to the course.

A student who has got the Migration/Transfer Certificate issued from the University shall not be allowed to re-appear in any examination for improvement of grade.

RULE 11 :Repeating Courses

A student having attendance shortage in any course may repeat the course by taking re-admission in that course in subsequent odd/even semester(s), whenever the course is being offered, within the maximum permissible duration of the programme.

If a student repeats a course, she/he has to fulfil all the desired requirements afresh including attendance, Continuous Internal Assessment and the End Semester Examination. In such case the course content shall be based on the syllabi of the course in force at the time of repetition of the course.

RULE 12 : Promotion Rules

A student shall be declared as 'promoted' to the next semester when she/he earns 'P' Grade or above in the last concluded semester examination, maintaining the spirit and pattern of semester

system and covering the mandatory components, such as Continuous Internal Assessment and End-Semester Examination in the NCC Courses.

A student shall be 'Provisionally Promoted' to the next semester if she/he secures less than 'P' grade but he /she has to pass all the courses of NCC course within permissible duration.

A cadet shall be eligible to attend the 'B' Certificate exam if he/she passed all the first four semester NCC course and completed one ATC/CATC. Similarly, cadet will be eligible to attend 'C' certificate examination if he/she has 'B' certificate and he /she has passed V, VI semester NCC course and attended one CATC/ATC after fourth semester and after having obtained 'B' certificate.

If a cadet/student is repeating a course in an academic session, whatever may be the reason, it shall not be counted in the total number of seats and shall not affect the fresh intake of cadets / student in that academic session.

RULE 13 :Computation of SGPA & CGPA

13. Computation of SGPA and CGPA . University may use their own criteria for giving the SGPA & CGPA which is prepared by the authorised academic body for the other courses.

Course Title: National Service Scheme

Semester III

Vocational skill development

To enhance the employment potential and to set up small business enterprises skills of volunteers, a list of 12 to 15 vocational skills will be drawn up based on the local conditions and opportunities. Each volunteer will have the option to select two skill-areas out of this list

Issues related environment

Environmental conservation, enrichment and sustainability, climatic change, natural resource management (rain water harvesting, energy conservation, forestation, waste land development and soil conservations) and waste management

Disaster management

Introduction and classification of disaster, rehabilitation and management after disaster; role of NSS volunteers in disaster management.

Entrepreneurship development

Definition, meaning and quality of entrepreneur; steps in opening of an enterprise and role of financial and support service institution.

Formulation of production oriented project

Planning, implementation, management and impact assessment of project

Documentation and data reporting

Collection and analysis of data, documentation and dissemination of project reports

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

SUBJECT CODE – MC 3 (C)

CATEGORY – NNP

SUBJECT NAME – PHYSICAL EDUCATION

SEMESTER – III

ENGLISH I

UNIT-1

1. Vocabulary
2. I(1) Synonyms

I.2 Antonyms

Common abbriviations in use

One words substitution

Words commonly Misspel

Idiosnatic Comparisions or similes

Word Formation by prefix and sutfix

UNIT-2

3. Common Errors & Transformations

Common Errors in sentences especially regarding number, gender,pronouns, prepositions, articles degrees etc.

Punctuations

Kinds of sentences- Assertive, Interrogative, Exclamatory, Imprative,Optative.

Transformation of sentences.

Tenses

UNIT-III

Correspondence

1. Personal letter- To Mother, Father, Brother, Sister, Friends.

2. Application- For leave, For scholarship, for apology, for admission a ground or place to conduct Tournament or programming etc.

Invitations- Format and Informal, Invitation for chief guest, Invitation card,

Notice writing

Office correspondence.

UNIT - IV

General Knowledge

Complete Knowledge about National Flag.

Complete Knowledge about National Song.

Complete Knowledge about National Anthem

Name of states and their capitals of Hindustan.

UNIT - V

Text

The story of Maharani laxmibai

The story of Freedom fight since 1857 to 1947,

The Bharat Chodo Andolan.

The story of Prathvi Raj Chouhan

Namak Satyagrah

Story of Barkatullah Bhopali

Note: The questions related to unit V should be test Based.

METHODS IN PHYSICAL EDUCATION

UNIT-I

1. Introduction

Definitions and Functions of Education.

Types of Education-Formal, Informal and Non-formal education.

Process of Education.

Principles of teaching.

Importance of Devices of Teaching.Various teaching devices: Exposition; and

Explanation,Narration, Description, Assignment and Home work.

UNIT-II

Teaching Techniques in Physical education

Lecture Method.

Command Method.

Demonstration Method.

Imitation Method.

Project Method.

Discussion Method.

Group Directed Practice Method.

Teaching Procedures in Physical Education

Whole Method.

Whole-Part-Whole Method

Part-Whole Method

Stage-Whole Method.

UNIT-III

Presentation Techniques-Meaning Importance and step of presentation

Preparation-Personal land Technical Preparation.

Command-Its types, command used in different situations.

Formation-Its types, and situations for using differentform
Class Management- Meaning and Principles.

Tournaments- Meaning and Types of Tournaments

Knockout or elimination Tournaments.

League or Round-Robin tournaments.

League cum knockout Tournament.

Challenge Tournament.

UNIT-IV

Lesson Planning

Meaning and objectives of lesson plan.

Values of lessons plan

Types of lesson plan

Principles of Lesson Plan.

Lessons and its parts along with their significance.

General and Specific Lesson Plan.

Coaching Lesson (A Brief Introduction).

Improvisation- Need, Ways & Means.

UNIT-V

Track Marking

Marking of 200 Meters track

Marking of 400 Meters track

Stagger marking for 200 meters and 400 meters run

Curve Marking- 800 meters run

Sector Marking for Throws- Shot-Put, Javelin, Discuss.

Marking for Jumps:- High Jump and Long Jump.

Marking of play Ground

Football
Hockey
Volleyball
Basketball
Badminton
Kabaddi
5.47 Kho-kho

CRICKET

UNIT-I

1. Introduction of the game and historical development with special reference of India.
2. Important tournaments held at National and International levelsand distinguished personalities related to the game.
3. Fundamental Skills.

Batting
Forward defensive stroke
Backward defensive stroke
Bowling
Simple bowling techniques.
Fielding
Defensive fielding - orthodox, Unorthodox.

3.2.2 Offensive fielding

Catching
High Catching
Slip Catching
Stopping and throwing techniques.
Wicket Keeping technique.

4. **Advanced Skill**

Batting
Forward defensive stroke
Backward defensive stroke
Forward off drive.
Forward on drive
Bowling
Simple bowling techniques.
Difference between pace.
Bowling and spin bowling : Off and leg spin bowling.
Fielding Different techniques of fielding and its importance.
Catching : Different types of catching, its technique andimportance.
Stopping and throwing : Different techniques and itsimportance's.

4.7 Wicket keeping : Different techniques and their implications.

5. **Rules and their interpretations and duties of Officials.**

JUDO

1 Introduction of the game and historical development with specialreference to India.

2. Important tournaments help at National and International levels and distinguished personalities related to the game.

3. Fundamental Skills.

Rej (salutation)

Ritsurei (Salutation in standing position).

Zarai (Salutation in the sitting position.)

How to wear Judo Costume.

Kumi Kata (Methods of holding judo costume).

Shisei (Posture in Judo).

Kuzushi (Act of disturbing the opponent posture).

Tsukuri and kake (Prepatory action for attack)

Ukemi (Break fall).

Urhiro Ukemi- (Rear break fall).

Yoko Ukemi (Side break fall).

Mae Ukemi (Front break fall).

Mae mawari Ukemi (Front rolling Break fall).

Shin Tai (Advance or Retreat foot Movement).

Suri-ashi (Gliding foot).

Tsugi-ashi (Following foot steps).

Ayumi-ashi (Walking steps).

Tai Sabaki (Management of the body).

Nage-waze (Throwing Techniques).

Hiza Guruma (Knee wheel).

Sesae Tsurikomi- ashi (Drawing ankle throw).

De-ashi hari (Advance foot sweep).

O Goshi (Major Loin).

Seoi. nage (Shoulder throw)- Ippon scionage andMorote Scionag.

Katama-waze (Grappling Techniques).

Kesa-gatame (Scaff hold).

Kata-gatma (Shoulder hold).

Kami-shiho gatama (Locking of upper fourquarters).

Method of escaping from each hold.

Lead-up games-

Break fall relay (maximum number of falls fromstanding position in one minute duration).

Mae- mawriukemi relay (maximum number of fallsin one minute duration).

Maximum number of shoulder throw in one minute.

Maximum number of obstacles jumped while doingmaemawri-ukemi.

4. Rules and their interpretations and duties of officials.

SEMESTER: IV

CATEGORY: CORE

SUBJECT CODE: EI 41

SUBJECT NAME: SENSORS AND TRANSDUCERS

COURSE OBJECTIVE: [60Hrs]

In the transducers in general respond to physical quantities that are non-electrical such as pressure, temperature, force etc and generate equivalent electrical signals at their output.

UNIT-1[12Hrs]

Introduction: Definition of Mechanical Systems, Philosophy and approach; Systems and Design: Mechatronic approach, Integrated Product Design, Modeling, Analysis and Simulation, Man Machine Interface.

UNIT-2[12Hrs]

Sensors and transducers: classification, Development in Transducer technology, Optoelectronics-Shaft encoders, CD Sensors, Vision System, etc.

UNIT-3[12Hrs]

Drives and Actuators: Hydraulic and Pneumatic drives, Electrical Actuators such as servo motor and Stepper motor, Drive circuits, open and closed loop control; Embedded Systems: Hardware Structure, Software Design and Communication, Programmable Logic Devices, Automatic Control and Real Time Control Systems;

UNIT-4[12Hrs]

Smart materials: Shape Memory Alloy, Piezoelectric and Magnetostrictive Actuators: Materials, Static and dynamic characteristics, illustrative examples for positioning, vibration isolation, etc.

UNIT-5[12Hrs]

Micromechatronic systems: Microsensors, Microactuators; Micro-fabrication techniques LIGA Process: Lithography, etching, Micro-joining etc. Application examples; Case studies Examples of Mechatronic Systems from Robotics Manufacturing, Machine Diagnostics, Road vehicles and Medical Technology.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to Design and validate DC and AC bridges.Analyze the dynamic response and the calibration of few instruments Learn about various measurement devices, their characteristics, their operation and their limitations. Understand statistical data analysis.Understand computerized data acquisition.

TEXT BOOKS:

1) Mechatronics System Design, Devdas Shetty & Richard A. Kolk, PWS Publishing Company (Thomson Learning Inc.)

2) Mechatronics: A Multidisciplinary Approach, William Bolton, Pearson Education

3) A Textbook of Mechatronics ,R.K.Rajput, S. Chand & Company Private Limited

4) Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, William Bolton, Prentice Hall

SEMESTER: IV

CATEGORY: CORE

SUBJECT CODE: EI 42

SUBJECT NAME: ANALOG CIRCUITS

COURSE OBJECTIVE: [60Hrs]

To prepare students to perform the analysis of any analog electronics circuit and to empower students to understand the design and working of BJT / FET amplifiers, oscillators and Operational Amplifier.

UNIT-I[12Hrs]

Diode Circuits, Amplifiermodels: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier. Biasing schemes for BJT and FET amplifiers, bias stability, variousconfigurations (such as CE/CS, CB/CG, CC/CD) and their features, small signal analysis, low frequency transistor models, estimation of voltage gain, input resistance, output resistance etc., design procedure for particular specifications, low frequency analysis of multistage amplifiers.

UNIT-II[12Hrs]

High frequency transistor models, frequency response of single stage andmultistage amplifiers, cascode amplifier. Various classes of operation (Class A, B, AB, C etc.), their power efficiency and linearity issues. Feedback topologies: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., calculation with practical circuits, concept of stability, gain margin and phase margin.

UNIT-III[12Hrs]

Oscillators: Review of the basic concept, Barkhausen criterion, RC oscillators(phase shift, Wien bridge etc.), LC oscillators (Hartley, Colpitt, Clapp etc.), non-sinusoidal oscillators.

Current mirror: Basic topology and its variants, V-I characteristics, outputresistance and minimum sustainable voltage (VON), maximum usable load. Differential amplifier: Basic structure and principle of operation, calculation of differential gain, common mode gain, CMRR and ICMR. OPAMP design: design of differential amplifier for a given specification, design of gain stages and output stages, compensation.

UNIT-IV[12Hrs]

OP-AMP applications: review of inverting and non-inverting amplifiers, integratorand differentiator,summing amplifier, precision rectifier, Schmitt trigger and its applications. Active filters: Low pass,high pass, band pass and band stop, design guidelines.

UNIT-V[12Hrs]

Digital-to-analog converters (DAC): Weighted resistor, R-2R ladder, resistorstring etc. Analog-todigital converters (ADC): Single slope, dual slope, successive approximation, flash etc. Switched capacitor circuits: Basic concept, practical configurations, application in amplifier, integrator,ADC etc.

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to

1. Understand the characteristics of diodes and transistors
2. Design and analyze various rectifier and amplifier circuits
3. Design sinusoidal and non-sinusoidal oscillators
4. Understand the functioning of OP-AMP and design OP-AMP based circuits
5. Design ADC and DAC

Reference Books:

1. J.V. Wait, L.P. Huelsman and GA Korn, Introduction to Operational Amplifier theory and applications, McGraw Hill, 1992.
2. J. Millman and A. Grabel, Microelectronics, 2nd edition, McGraw Hill, 1988.
3. P. Horowitz and W. Hill, The Art of Electronics, 2nd edition, Cambridge University Press, 1989.
4. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College11
5. Publishing, Edition IV
6. Paul R. Gray and Robert G.Meyer, Analysis and Design of Analog Integrated Circuits, John Wiley, 3rd Edition.

List of Experiments :

Apparatus Required –Dual Channel Cathode Ray Oscilloscope (0-20 MHz), Function Generator (10MHz and above), Dual Power Supply, LM741, TL082, MPY634,TPS7250, Probes, digital multimeter.

1. To measure and compare the op-amp characteristics: offset voltages, bias currents, CMRR, Slew Rate of OPAMP LM741 and TL082.

2. To determine voltage gain and frequency response of inverting and non-inverting amplifiers using TL082.

3. To design an instrumentation amplifier and determine its voltage gain using TL082.

4. To design op-amp integrator (low pass filter) and determine its frequency response.

5. To design op-amp differentiator (high pass filter) and determine its frequency response.

6. Design 2nd order Butterworth filter using universal active filter topology with LM741

7. To design Astable, Monostable and Bistablemultivibrator using 555 and analyse its characteristics.

8. Automatic Gain Control (AGC) Automatic Volume Control (AVC)using multiplier MPY634

9. To design a PLL using opampwith MPY634 anddetermine the free running frequency, the capture range and the lock in range of PLL

10. Design and test a Low Dropout regulator using op-amps for a given voltage regulation characteristic and compare the characteristics with TPS7250 IC

SEMESTER: IV

CATEGORY: CORE

SUBJECT CODE: EI 43

SUBJECT NAME: MICROCONTROLLERS

COURSE OBJECTIVE: [60Hrs]

1. To provide practical experience with microcontroller systems;
2. To expose the students to design work where there is no single correct solution, rather competing objectives; and
3. To encourage cooperative team work and develop communication skills.

UNIT I[12Hrs]

Introduction to 8085 Microprocessor

Von Newman model, various subsystems, CPU, Memory, I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer. 8085 microprocessor organization.

UNIT II[12Hrs]

8086 and its Assembly Language programming

Instruction formats, addressing modes, instruction set, assembly language programming, ALP tools- editor, assembler, linker, locator, debugger, emulator. BIU and EU, register organization, pin diagram, memory organization, clock generator 8284, buffers and latches, 8288 bus controller, maximum and minimum modes.

8086 based multiprocessor systems

Interconnection topologies, coprocessors 8087 NDP, I/O processors 8089 IOP, bus arbitration and control, lightly and tightly coupled systems.

UNIT III[12Hrs]

Peripheral devices and their interfacing

Memory interfacing, Programmable input/output ports 8255, Programmable interval timer 8253, keyboard/display controller 8279, CRT controller 8275, Programmable communication interface 8251 USART.

UNIT IV[12Hrs]

Interrupts of 8086

Interrupts and interrupt service routine, interrupt cycle, maskable and non-maskable interrupts, interrupt programming. Programmable interrupt controller 8259.

DMA in 8086

Basic DMA operation, modes of DMA transfer, DMA controller 8257.

UNIT V [12Hrs]

8051 Microcontroller

Features, architecture, Pin Diagram, memory organization, external memory interfacing, instruction syntax, data types, subroutines, addressing Modes, instruction set, ALP of 8051. Applications of 8051.

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to

1. Do assembly language programming
2. Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc.
3. Develop systems using different microcontrollers
4. Understand RSIC processors and design ARM microcontroller based system

References:

1. Ray and Bhurchandi: Advanced microprocessors and peripherals, TMH.
2. Brey: The Intel Microprocessors, Architecture, Programming and Interfacing, Pearson Education.
3. Senthil Kumar: Microprocessors and interfacing, Oxford University press.
4. Bahadure: Microprocessors 8086 and Pentium family, PHI Learning.
5. Udayashankara and Mallikarjunaswamy: 8051 Microcontroller, TMH.
6. Mazidi and Mazidi: The 8051 Microcontroller and Embedded Systems, Pearson Education
7. D. V. Hall: Microprocessors and Interfacing, TMH.

List of Experiments:

1. Assembly Language Programs of Microprocessor 8085 and 8086.
2. Assembly Language Programs of Microcontroller 8051.
3. Assembly Language Programs for Interfacing Chips.
4 .To write an ALP to perform addition of two 16-bit signed and unsigned numbers.
5. To write an ALP to perform substraction of two 16-bit signed and unsigned numbers.
6. To write an ALP to perform multiplication of two 16-bit signed and unsigned numbers.
7. To write an ALP to perform division of two 16-bit signed and unsigned numbers.
8. To write an ALP to perform addition of two ASCII bytes.
9. To write an ALP to perform substraction of two ASCII bytes
10.To write an ALP to perform multiplication of two ASCII bytes.
11.To write an ALP to perform the Logical AND operation.
12.To write an ALP to perform the Logical OR operation.
13.To write an ALP to perform the Logical XOR operation

SEMESTER: IV

CATEGORY: CORE

SUBJECT CODE: EI 44

SUBJECT NAME: ELECTRONICS & INSTRUMENTATION

(60 Hrs)

COURSE OBJECTIVEs:-

Students will get knowledge of construction and working principal and applications of analog and digital instruments Measure electrical parameter like R, L, C using electrical bridges. To provide students with a strong mathematical foundation to acquire the professional competence knowledge and skills.

UNIT-I (12 Hrs)

Measurement and Error: Accuracy and Precision, Sensitivity, Linearity, Resolution, Hysteresis, Loading Effect. Measurements of Current, Voltage, Power and Impedance: DC and AC Ammeter, DC Voltmeter Chopper type and solid-state, AC voltmeter using Rectifier, Average, RMS, Peak Responding voltmeters, Multi-meter, Power meter, Bolometer and Calorimeter.

UNITII (12 Hrs)

Cathode Ray Oscilloscope (CRO): Different parts of CRO, Block diagram, Electrostatic focusing, Electrostatic deflection, Post deflection acceleration, Screen for CRTs, Graticules, Vertical and Horizontal deflection system, Time base circuit, Oscilloscope Probes, Applications of CRO, Special purpose CROs Multi input, Dual trace, Dual beam, Sampling, Storage (Analog and Digital) Oscilloscope.

UNIT-III (12 Hrs)

AC Bridges: Maxwell's bridge (Inductance and Inductance-Capacitance), Hay's bridge, Schering Bridge (High voltage and Relative permittivity), Wein bridge, Wagner earth detector, Impedance measurement by Q-meter. Non-Electrical Quantities (Transducer): Classification of Transducers, Strain gauge, Displacement Transducer- Linear Variable Differential Transformer (LVDT) and Rotary Variable Differential Transformer (RVDT), Temperature Transducer- Resistance Temperature Detector (RTD), Thermistor, Thermocouple, Piezo-electric transducer, Optical Transducer- Photo emissive, Photo conductive, Photo voltaic, Photo-diode, Photo Transistor, Nuclear Radiation Detector.

UNIT-IV (12 Hrs)

Signal generator & Display: Signal and Function Generators, Sweep Frequency Generator, Pulse and Square Wave Generator, Beat Frequency Oscillator, Digital display system and indicators, Classification of Displays, Display devices, Light Emitting diodes(LED), Liquid Crystal Display(LCD).

UNIT-V (12 Hrs)

Digital Measurement and Instruments: Advantages of Digital Instrument over Analog Instrument, Digital-to-analog conversion (DAC) - Variable resistive type, R-2R ladder Type, Binary ladder, weighted converter using Op-amp and transistor, Practical DAC. Analog-to-digital Conversion (ADC) -Ramp Technique, Dual Slope Integrating Type, Integrating Type (voltage to frequency), Successive Approximations, digital voltmeters and multi-meters, Resolution and sensitivity of digital meter, PLC structure, principle of operation, response time and application.

COURSE OUTCOMES:

Applied Electronics & Instrumentation Engineering is an advanced branch of engineering which deals with the application of existing or known scientific knowledge in electronics, instrumentation, measurements and control for any process, practical calibration of instruments, automation of processes etc

References:

1. H. S. Kalsi: Electronics Instrumentation, TMH.
2. K. Sawhney: Instrumentation and Measurements, Dhanpat Rai and Co.
3. Helfric and Cooper: Modern Electronic Instrumentation and Measurement Techniques; Pearson.

List of Experiments:

All experiments (wherever applicable) should be performed through the following steps.

Step 1: Circuit should be designed/drafted on paper.

Step 2: The designed/drafted circuit should be simulated using Simulation Software

Step 3: The designed/drafted circuit should be tested on the bread board and compare the results with the simulated results.

Step 4: The bread board circuit should be fabricated on PCB by one batch using PCB machine.

1. Study of CRO and Function Generator.

2. Displacement measurement by LVDT.

3. Force measurement by strain gauge.

4. Measurement of Capacitor, Self-induction using Q-meter.

5. Temperature measurement by thermistor, RTD and thermocouple.

6. Optical Transducer- Photo conductive, Photo voltaic, Photo-diode, Photo-Transistor

7. Design of digital to analog converter.

8. PLC operation and applications (for example: relay, timer, level, traffic light etc.)

SEMESTER: IV

CATEGORY: EIHS

SUBJECT CODE: BE 41

SUBJECT NAME: ENGINEERING ECONOMICS AND ACCOUNTING

COURSE OBJECTIVE: [60Hrs]

Objective of the course to introduce basics of Managerial Economics, Types of demand and related to concepts – Profit & Loss Statement and related concepts.

UNIT I[12Hrs]

INTRODUCTION - Managerial Economics – Relationship with other disciplines – Firms: Types, objectives and goals – Managerial decisions – Decision analysis.

UNIT II [12Hrs]

DEMAND & SUPPLY ANALYSIS Demand – Types of demand – Determinants of demand – Demand function – Demand elasticity – Demand forecasting – Supply – Determinants of supply – Supply function – Supply elasticity.

UNIT III [12Hrs]

PRODUCTION AND COST ANALYSIS - Production function – Returns to scale – Production optimization – Least cost input – Isoquants – Managerial uses of production function.Cost Concepts – Cost function – Types of Cost – Determinants of cost – Short run and Long run cost curves – Cost Output Decision – Estimation of Cost.

UNIT IV[12Hrs]

PRICING Determinants of Price – Pricing under different objectives and different market structures – Price discrimination – Pricing methods in practice – role of Government in pricing control.

UNIT V [12Hrs]

FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT) Balance sheet and related concepts – Profit & Loss Statement and related concepts – Financial Ratio Analysis – Cash flow analysis – Funds flow analysis – Comparative financial statements – Analysis & Interpretation of financial statements. Investments

– Risks and return evaluation of investment decision – Average rate of return – Payback Period – Net Present Value – Internal rate of return.

COURSE OUTCOMES:

1. Have an idea of Economics in general, Economics of India particularly for public sector agencies and private sector businesses
2. Be able to perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
3. Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
4. Be able to understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure.
5. Be able to quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.
6. Be able to understand how competitive bidding works and how to submit a competitive bid proposal.

TEXT BOOKS: 1. McGuigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.

2. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition, 2005.

REFERENCES: 1. Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.

2. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, New Delhi, 2007.

SEMESTER: IV

CATEGORY: LC

SUBJECT CODE: BE 42

SUBJECT NAME: SOFTWARE LAB-II
(MATLAB/SCILAB/DOT NET)

COURSE OBJECTIVE: **[60Hrs]**

Familiarization of the syntax, semantics, data-types and library functions of numerical computing languages such as MATLAB and/or SCILAB, and application of such languages for implementation/simulation and visualization of basic mathematical functions relevant to electronics applications.

Study of simulation software (any one Scilab/ MatLab etc.) Introduction to Scilab / Matab, Study of Scilab / Matlab programming environment, Modeling, Design and development of Programs. Overview and Study of the key features and applications of the software. Application of the software in the Communications and Communication Systems.

1. Programs Related to Control System response plots, determining transient PID controller on control system, Bode plot, Nyquist plot and Root Locus plot, state space analysis. 2. Programs Related to Communication Systems (Generation, addition of noise and Detection), AM, FM, PM, PAM, PCM, PSK, FSK etc. 3. Programs related to Data Communications line encoding techniques.

References:

1. Rudra Pratap: Getting Started with MATLAB, Oxford
2. http://www.scilab.in
3. http://ekalavya.it.iitb.ac.in/contents.do?topic=Scilab
4. Vinu V. Das: Programming in Scilab, New Age Publisher.
5. Chapman Stephen J.: MATLAB Programming for Engineers, Thomson Cengage
6. Proakis: Contemporary Communication System Using MATLAB; Thomson Cengage.
7.Kuo: Automatic Control Systems, PHI Learning.
8.Singh and Chaudhari: Matlab Programming, PHI Learning

COURSE OUTCOMES:

On successful completion of the course, the students should be able to

1. Understand the need for simulation/implementation for the verification of mathematical functions.

2. Understand the main features of the MATLAB/SCILAB program development Environment to enable their usage in the higher learning.

3. Implement simple mathematical functions/equations in numerical computing environment such as MATLAB/SCILAB.

4. Interpret and visualize simple mathematical functions and operations thereon using plots/display.

5. Analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using MATLAB/SCILAB tools.

SEMESTER: IV

CATEGORY: MC

SUBJECT CODE: BE 43

SUBJECT NAME: ENVIRONMENT SCIENCE

(60Hrs)

COURSE OBJECTIVEs

The aim of E.V.S.(environmental studies) is to develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge ,Skills, attitudes ,motivations and commitment to work individually and collectively towards solutions of current problems and prevention.

UNIT I (4Hrs)

The Multidisciplinary nature of environmental studies Definition, scope and importance, Need for public awareness.

UNIT II (8Hrs)

Natural Resources Renewable and non renewable resources: a) Natural resources and associated problems Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems. Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, case studies. Energy Resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, case studies Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification. b) Role of individual in conservation of natural resources. c) Equitable use of resources for sustainable life styles.

UNIT III (8Hrs)

Eco Systems Concept of an eco system Structure and function of an eco system. Producers, consumers, decomposers. Energy flow in the eco systems. Ecological succession. Food chains, food webs and

ecological pyramids. Introduction, types, characteristic features, structure and function of the following eco systems: Forest ecosystem Grass land ecosystem Desert ecosystem. Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT IV (8Hrs)

Biodiversity and its Conservation Introduction-Definition: genetics, species and ecosystem diversity biogeographically classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, national and local level. India as a mega diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitats loss, poaching of wild life, man wildlife conflicts. Endangered and endemic spaces of India. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT V (8Hrs)

Environmental Pollution Definition Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes Role of an individual in prevention of pollution Pollution case studies Disaster management: Floods, earth quake, cyclone and land slides.

UNIT VI (8Hrs)

Social issues and the Environment Form unsustainable to sustainable development Urban problems related to energy Water conservation, rain water harvesting, water shed management Resettlement and rehabilitation of people; its problems and concerns, case studies Environmental ethics: issues and possible solutions Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. Wasteland reclamation Consumerism and waste products Environment protection Act, Air (prevention and control of pollution) Act Water (prevention and control of pollution) Act Wildlife protection act Forest conservation act Issues involved in enforcement of environmental legislations Public awareness

UNIT VII (8 Hrs)

Human population and the environment Population growth and variation among nations Population explosion- family welfare program Environment and human health Human rights Value education HIV / AIDS Women and child welfare Role of information technology in environment and human health Case studies.

UNIT VIII (10Hrs)

Field work Visit to a local area to document environment assets river / forest / grassland / hill / mountain. Visit to a local polluted site-urban/rural/industrial/agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hills lopes, etc (field work equal to 5 lecture works)

COURSE OUTCOMES:

An Environmental Studies major will be able to recognize the physical, chemical, and biological components of the earth's systems and show how they function. An Environmental Studies major will be able to apply lessons from various courses through field experiences.

Recommended Books:

1. Textbook of Environmental studies, Erach Bharucha, UGC
2. Fundamental concepts in Environmental Studies, D D Mishra, S Chand & Co Ltd

SEMESTER: IV

CATEGORY: PDFS

SUBJECT CODE: BE 44

SUBJECT NAME: PROFESSIONAL DEVELOPMENT FINISHING SCHOOL

LEVEL-II

TOTAL - 36 HOURS

COURSE OBJECTIVE

The students are to be groomed with respect to personality development. Further improvement in English, Aptitude and reasoning ability is desirable.

UNIT-I (18 HRS)

Conversational English:

Grammar mainly Prepositions (550 small sentences of daily use related to day to day life **(18 –HOURS)**

UNIT-II (18 HRS)

Aptitude / Reasoning:

Quantitative Aptitude and Logical Reasoning – Level II

Problem solving on,

Partnerships, Profit Loss and Discounts, Time and Distance.

Logical sequence of Figures, Cubes, Blood Relations, Data Sufficiency, Arrangement Problems.**(18 –HOURS)**

Course Outcome

Further improvement in English, Aptitude and reasoning ability is achieved.

OFFERING NCC A GENERAL GENERIC ELECTIVE CREDIT COURSE IN UNIVERSITIES UNDER CHOICE BASED CREDIT SYSTEM TO ALIGN WITH NEW EDUCATION POLICY 2020

CONTENTS

SECTIONI:NCC CREDIT COURSE DESIGN DOCOMENT

UNDER CHOICE BASED CREDIT SYSTEM AS GENERAL ELECTIVE FOR SENIOR DIVISION / SENIOR WING

4. **Preamble**. The National Cadet Corps (NCC) is governed by NCC Act 1948 and attendant NCC Rules. It functions under the Ministry of Defence and is headed by DGNCC. It is organised into 17 State Directorates each headed by an Additional/Deputy Director General. The aims of NCC are:-
   (a) To develop character, camaraderie, discipline, secular outlook, the spirit of adventure, sportsman spirit and ideals of selfless service amongst cadets by working in teams, honing qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.
   (b) To create a pool of organized, trained and motivated youth with leadership qualities in all walks of life, who will serve the Nation regard less of which career they choose.
   (c) To provide a conducive environment to motivate young Indians to choose the Armed Forces as a career.
5. **Purpose.** Currently NCC training is imparted as extra-curricular activity to volunteer students from recognized schools and colleges who enroll as cadets. NCC as a Credit Course is designed with an intent to transform NCC training into a curricular activity from an extra-curricular thereby providing academic credits to students undergoing NCC training along with other attended advantages to the cadets in the college/ university.

Introduction to NCC Credit Course Design. Institutional Training is the mainstay of NCC training and it is conducted at colleges and universities by Associate NCC Officers and Armed Forces personnel. The application of knowledge gained through institutional training is further honed or developed to a higher degree in NCC Camps. The Institutional Training syllabus comprises Common Subjects and Specialised Subjects (military component). NCC Credit Course is designed to offer Institutional Training of 330 Senior Wing /Division is over six semesters (three years), comprising 300 periods (excluding Camp), of which 120 periods 180 are meant for theory with 108 credits and 180 periods for practical with 6 credits. Each period is counted as hour. The ratio between theory and practical in terms of number of hours of training is 5:6, but in terms of credits is 5:3, since as per CBCS two hours of practical is counted towards one period of training as against one hour for theory. In addition two separate courses have been designed for two Camps normally referred to as Annual Training Camps (ATC).

Training schedules planned for cadets ensure that the optimum benefits of the NCC organization reach maximum number of cadets. The main emphasis is on practical training which in consonance with theory is made to facilitate active participation of learner, better assimilation of knowledge, and proper development of various skills, strengthening of mind and body which is the bedrock of NCC training.

NCC GENERAL ELECTIVE CREDIT COURSE DESIGN SUMMARY					
Semester	**Credits Allocated**			**Total**	**Remarks**
	Theory	**Practical**	**Camp**		
Semester - I	**01**	**01**	**-**	**02**	
Semester - II	**01**	**01**	**-**	**02**	
Semester – III	**01**	**01**	**05**	**07**	**Credits of 1st Camp merged with 3rd Sem**
Semester – IV	**02**	**01**	**-**	**03**	
Semester – V	**01**	**01**	**05**	**07**	**Credits of 2nd Camp merged with 5th Sem**
Semester - VI	**02**	**01**	**-**	**03**	
Total	**08**	**06**	**10**	**24**	**Twenty-Four Credits**

INSTITUTIONAL TRG SYLLABUS

COMMON SUBJECTS				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**NCC General**	**06**	**-**	**06**
2	**National Integration**	**04**		**04**
3	**Drill**	**-**	**45**	**45**
4	**Weapon Training**	**-**	**25**	**25**
5	**Personality Development**	**25**		**25**
6	**Leadership**	**12**	**-**	**12**
7	**Disaster Management**	**13**		**13**
8	**Social Service & Community Development**	**08**	**39**	**47**
9	**Health & Hygiene**	**-**	**10**	**10**
10	**Adventure**	**01**		**01**
11	**Environmental awareness & conservation**	**03**		**03**
12	**Obstacle Training**	**-**	**09**	**09**
13	**General Awareness**	**04**		**04**
14	**Border & Coastal Areas**	**06**		**06**
TOTAL HOURS COMMON SUBJECTS(a)		**82**	**128**	**210**

SPECIALSED SUBJECTS (ARMY)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practical**	
1	**Armed Forces**	**09**	**-**	**09**
2	**Map Reading**	**-**	**24**	**24**
3	**Communications**	**03**	**03**	**06**
4	**Infantry Weapons**	**03**	**03**	**06**
5	**Field Craft & Battle Craft**		**22**	**22**

6	**Military History**	**23**	**-**	**23**
Total Hours		**38**	**52**	**90**

SPECIALSED SUBJECTS (NAVY)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**Naval Orientation**	**12**	**-**	**12**
2	**Naval Communication**	**02**	**18**	**20**
3	**Navigation**	**02**	**03**	**05**
4	**Seamanship**	**15**	**18**	**33**
5	**Fire Fighting and Damage Control**	**04**	**03**	**07**
6	**Ship and Boat Modelling**	**03**	**10**	**13**
Total hours		**38**	**52**	**90**

SPECIALISED SUBJECTS (AIR FORCE)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**General Service Knowledge**	**08**	**-**	**08**
2	**Air Campaign**	**06**	**02**	**08**
3	**Principles of flight**	**06**	**06**	**12**
4	**Airmanship**	**01**	**07**	**08**
5	**Navigation**	**05**	**-**	**05**
6	**Aeroengines**	**06**	**-**	**06**
7	**Basic flight Instruments**	**03**	**03**	**06**
8	**Aero modelling**	**03**	**34**	**37**
Total Hours		**38**	**52**	**90**

INSTITUTIONAL TRAINING: TOTAL HOURS & CREDITS

INSTITUTIONAL TRAINING: TOTAL HOURS & CREDITS			
ITEM	Periods (1 hour duration each)		Total
	Lectures/Tutorials	Practicals	
TOTAL HOURS COMMON SUBJECTS	82	128	210
TOTAL HOURS SPECIALISED SUBJECTS(ARMY/NAVY/AIR FORCE)	38	52	90
TOTAL HOURS INSTITUTIONAL TRAINING	120	180	300
TOTAL CREDITS INSTITUTIONAL TRAINING	08 CREDITS (15 HOUR THEORY = 1 CREDIT POINT)	6 CREDITS (30 HOURS PRACTICAL TRAINING = 1 CREDIT POINT)	

NCC CAMP TRAINING SYLLABUS

COMMON SUBJECTS				
S No.	**Subjects**	**Periods**		**Total**
		L/T	**P**	
1.	Physical Training	-	18	18
2.	Drill	-	32	32
3.	Weapon Training	08	28	36
4.	National Integration and Awareness	08	-	08
5.	Personality Development	08	12	20
6.	Leadership	08	-	08
7.	Disaster Management	08	-	08
8. .	Social Service and Community Development	-	08	08
9.	Health & Hygiene	08	-	08
10.	Obstacle Training	-	04	04
11.	Military History	04	-	04
12.	Communication	04	-	04
13.	Games	-	18	18
14.	Culture	-	18	18
	TOTAL	**56**	**138**	**194**
SPECIALISED SUBJECTS				
1.	Map Reading	-	24	24
2.	Infantry Weapons	04	02	06
3.	Field Craft & Battle Craft	-	16	16
	TOTAL	**04**	**42**	**46**
	GRAND TOTAL	**60 (4 credit)**	**180 (6 credit)**	**240 (10 credit)**

NCC CAMP TRAINING SYLLABUS (FOR THEORY)

Ser No	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Weapon Training	-	-	04	-	04	-	08
2.	National Integration & Awareness	-	-	04	-	04	-	08
3.	Personality Development	-	-	04	-	04	-	08
4.	Leadership	-	-	04	-	04	-	08
5.	Disaster Management	-	-	04	-	04	-	08
6.	Health & Hygiene	-	-	04	-	04	-	08
7.	Military History			02		02		04
8.	Communication			02		02		04
9.	Infantry Weapons	-	-	02	-	02	-	04
	TOTAL	-	-	30	-	30	-	60
	TOTAL Credit	-	-	2	-	2	-	4

NCC CAMP TRAINING SYLLABUS (FOR PRACTICAL)

Ser No	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Physical Training	-	-	09	-	09	-	18
2.	Drill	-	-	16	-	16	-	32
3.	Weapon Training	-	-	14	-	14	-	28
4.	Personality Development	-	-	06	-	06	-	12
5.	Social Service and Community Development	-	-	04	-	04	-	08
6.	Obstacle Training	-	-	02	-	02	-	04
7.	Games			09		09		18
8.	Culture			09		09		18
9.	Map Reading	-	-	12	-	12	-	224
10.	Infantry Weapons	-	-	01	-	01	-	02
11.	Field Craft & Battle Craft	-	-	08	-	08	-	16
	TOTAL			**90**		**90**		**180**
	TOTAL CREDIT			**03**		**03**		**06**

SEMESTER WISE COURSE DESIGN ARMY CADETS

INSTITUTIONAL TRAINING: SEMESTER WISE DISTRIBUTION OF NCC SYLLABUS FOR THEORY(ARMY CADETS)

S. NO.	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	NCC General	06	-	-	-	-	-	06
2.	National Integration	04	-	-	-	-	-	04
3.	Personality Development	02	05	05	04	06	04	25
4.	Leadership	-	05	04	03	-	-	12
5.	Disaster Management	-	-	03	10	-	-	13
6.	Social Service & Community Development	03	05	-	-	-	-	08
7.	Adventure	-	-	01	-	-		01
8.	Environmental Awareness & Conservation	-	-	-	03	-		03
9.	General Awareness	-	-	-	04	-		04
10.	Border & Coastal Areas	-	-	02	-	02	02	06
11.	Armed Forces	-	-	-	06	-	03	09
12.	Infantry Weapons	-	-	-	-	3	-	3
13.	Communication	-	-	-	-	-	03	03
14.	Military Hospital	-	-	-	-	04	19	23
	TOTAL	15	15	15	30	15	30	120
	TOTAL Credit	1	1	1	2	1	2	08

INSTITUTIONAL TRAINING: SEMESTER WISE DISTRIBUTION OF NCC SYLLABUS FOR PRACTICAL (ARMY CADETS)

S. NO.	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Drill	12	12	08	07	03	03	45
2.	Field Craft & Battle Craft	03	04	04	04	04	03	22
3.	Map Reading	03	05	04	04	04	04	24
4.	Weapons Training	05	04	04	04	04	04	25
5.	Communication	-	-	-	-	-	03	03
6.	Infantry Weapons	-	-	-	-	-	03	03
7.	Social Service & Community Development	07	05	05	06	06	10	39
8.	Health & Hygiene	-	-	-	05	05	-	10
9.	Operation Training	-	-	05	-	04		09
	TOTAL	30	30	30	30	30	30	180
	TOTAL Credit	01	01	01	01	01	01	06

INSTITUTIONAL TRAINING: SEMESTER WISE THEORY DETAILED SYLLABUS (ARMY CADETS)

SEMESTER I					
S.No	Subject	Periods	Chapter	Lesson	Hours
1	NCC General	6	NCC-I	Aims, Objectives and Org of NCC	1
			NCC-II	Incentives	2
			NCC-III	Duties of NCC Cadets	1
			NCC-IV	NCC Camps: Types and Conduct	2
2	National Integration and Awareness	4	NI-I	National Integration: Importance and Necessity	1
			NI-II	Factors affecting National Integration	1
			NI-III	Unity in Diversity	1
			NI-IV	Threats to National Security	1
3	Personality Development	2	PD - I	Factors Self-Awareness Empathy Critical and Creative Thinking Decision Making and Problem Solving	2
4	Social Service and Community Development	3	SSCD - I	Basics of Social Service Rural Development Programmes NGO's Contribution of Youth	3
				TOTAL HOURS	**15**
				TOTAL CREDITS	**1**

SEMESTER II					
S.No	Subject	Periods	Chapter	Lesson	Hours
5	Personality Development	5	PD-II	Communication Skills	3
			PD-III	Group Discussion -Coping with Stress and Emotions	2
6	Leadership	5	L-I	Leadership Capsule Traits Indicators Motivation Moral Values Honour Code	3
			L-II	Case Studies Shivaji, Jhansi Ki Rani,	2
7	Social Service and Community Development	5	SS-IV	Protection of Children & Women Safety	1
			SS-V	Road/Rail Travel Safety	1
			SS-VI	New Initiatives	2
			SS-VII	Cyber and Mobile Security Awareness	1
				TOTAL HOURS	**15**
				TOTAL CREDITS	**1**

SEMESTER III					
S.No	Subject	hours	Chapter	Lesson	HOURS
8	Personality Development	5	PD-III	Group Discussions - Change your Mindset	2
			PD-V	Public Speaking	3
9	Leadership	4	L-II	Case Studies – APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy	4
10	Disaster Management	3	DM-I	Disaster Management Capsule Organisation Types of Disasters Essential Services Assistance Civil Defence Organisation	3
11	Adventure	1	AD-I	Adventure activities	1
12	Border & Coastal Areas	2	BCA-I	History, Geography & Topography of Border/ Coastal Areas	2
TOTAL HOURS					**15**
TOTAL CREDITS					**1**

SEMESTER IV					
S.No	Subject	hours	Chapter	Lesson	HOURS
13	Personality Development	4	PD-III	Group Discussions - Time Management, Social Skills	4
14	Leadership	3	L-II	Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war	3
15	Disaster Management	9	DM-II	Initiative Trg, Organising Skills, Dos and Don'ts Natural Disasters Man Made Disasters	9
		1	DM-III	Fire Services and Fire Fighting	1
16	Environmental Awareness	3	EA-I	Environmental Awareness and Conservation	3
17	General Awareness	4	GA-I	General Awareness	4
18	Armed Forces	6	AF-1	Army, Navy, Air Force and Central Armed Police Forces	6
TOTAL HOURS					30
TOTAL CREDITS					2

SEMESTER V					
S.No	Subject	hours	Chapter	Lesson	HOURS
19	Personality Development	6	PD-III	Group Discussions - Team Work	2
			PD-V	Public Speaking	4
20	Border & Coastal Areas	2	BCA-II	Security Setup and Border/Coastal management in the area	2
21	Introduction to Infantry Battalion and its Equipments	3	INF-1	Organisation of Infantry Battalion & its weapons	3
22	Military History	4	MH-3	Study of Battles of Indo-Pak Wars 1965 & 1971	4
TOTAL HOURS					15
TOTAL CREDITS					1

SEMESTER VI					
S.No	Subject	hours	Chapter	Lesson	HOURS
25	Personality Development	3	PD-IV	Career Counselling, SSB Procedure and Interview Skills	3
27	Border & Coastal Areas	2	BCA-III	Security Challenges & Role of cadets in Border management	2
28	Armed Forces	3	AF-2	Modes of Entry into Army, Police and CAPF	3
29	Military History	19	MH-1	Biographies of Renowned Generals	6
			MH-2	War Heroes : Param Veer Chakra Awardees	3
			MH-3	Study of Battles of Kargil	2
			MH-4	War Movies	8
30	Communication	3	C-1	Introduction to Communication & Latest Trends	3
TOTAL HOURS					30
TOTAL CREDITS					2

SIX SEMESTER NCC COURSE SYLLABUS

Training Objectives: Institutional Training

49. Institutional training includes basic military training of the cadets as part of the curriculum with its long-standing effort to mould young volunteers into disciplined and responsible citizens of India. NCC course is aimed to achieve following learning objectives:-

(a) Develop character, camaraderie, discipline, secular outlook, the spirit of adventure, sportsman spirit and ideals of selfless service amongst cadets by working in teams, honing qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.

(b) To create interest in cadets by including and laying emphasis on those aspects of Institutional Training which attract young cadets into the NCC and provides them an element of thrill and excitement.

(c) To inculcate defence Services work ethos that is characterized by hard work, sincerity of purpose, honesty, ideal of selfless service, dignity of labour, secular outlook, comradeship, spirit of adventure and sportsmanship.

(d) To create a pool of organized, trained and motivated youth with leadership qualities in all walks of life, who will serve the Nation regardless of which career they choose.

(e) To provide conducive environment to motivate young Indians to choose the Armed Forces as a career.

SEMESTER I COURSE MODULE : NATIONAL CADET CORPS I

National Cadet Corps : Course Details			
Course Title: National Cadet Corps I			
Course Code	**BNCC01GE03**	**Credits**	**1(Thr)+ 1(Pr) = 03**
L /T + P	**15+30**	**Course Duration**	**1 Semester**
Semester	**I (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e, 25% internal assessment and 75% end term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

50. **Course Objectives:** Cadets will be able to: -

(a) Know about the history of NCC, its organization, and incentives of NCC for their career prospects.

(b) Acquire knowledge of duties and conduct of ncc cadets.

(c) Understand about different NCC camps and their conducts.

(d) Understand the concept of national integration and its importance.

(e) Understand the concept of self-awareness and emotional intelligence.

(f) Understand the concept of critical & creative thinking.

(g) Understand the process of decision making & problem solving.

(h) Understand the concept of team and its functioning.

(i) Understand the concept and importance of Social service.

51. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Imbibe the conduct of NCC cadets.

(b) Respect the diversity of different Indian culture.

(c) Practice togetherness and empathy in all walks of their life.

(d) Do their own self analysis and will workout to overcome their weakness for better performance in all aspects of life.

(e) Understand creative thinking & its components.

(f) Think divergently and will try to break functional fixedness.

(g) Make a team and will work together for achieving the common goals.

(h) Do the social services on different occasions.

52. Course Content Part (I) Theory

(a) **Unit 1- NCC General (N) (Contact Hrs. 06)**. Introduction of NCC, History, Aims, Objective of NCC & NCC as Organization, Incentives of NCC, Duties of NCC Cadet. NCC Camps: Types & Conduct.

(b) **Unit 2-National Integration & Awareness (NI) (Contact Hrs. 04)** . National Integration: Importance & Necessity, Factors Affecting National Integration, Unity in Diversity & Role of NCC in Nation Building, Threats to National Security.

(c) **Unit 3- Personality Development (Contact Hrs. 3)**. Intra & Interpersonal skills - Self-Awareness-&Analysis, Empathy, Critical & creative thinking, Decision making and problem solving.

(d) **Unit 4- Social Service and Community Development(Contact Hrs. 02)**. Basics of social service and its need, Types of social service activities, Objectives of rural development programs and its importance, NGO's and their contribution in social welfare, contribution of youth and NCC in Social welfare.

Course Content Part (II) Practical

53. **Course Objectives:** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of foot drill.

(c) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(d) Develop awareness about different types of terrain and how it is used in battle craft.

(e) Develop the concept of various markings on the map and how they are co-related to the ground features.

(f) Understand the various social issues and their impact on social life.

(g) Develop the sense of self-less social service for better social & community life.

54. **Expected Learning Outcomes:** After completing this course, the cadets will be able to: -

(a) Perform foot drill and follow the different word of command.

(b) Fire a weapon effectively with fair degree of marksmanship.

(c) Undertake point to point navigation and take part in route marches by day and night.

(d) Perform the social services on various occasions for better community & social life.

55. Course Content Part (II) Practical

(a) **Unit 1. Drill (Contact Hrs. 12)**. Foot Drill- Drill ki Aam Hidayaten, Word ki Command, Savdhan, Vishram, Aram Se, Murdna, Kadvar Sizing, Teen Line Banana, Khuli Line, Nikat Line, Khade Khade Salute Karna Parade Par, Visarjan, Line Tod, Tej Chal, Tham aur Dhire Chal, Tham.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 05)**. Introduction & Characteristics of .22 rifle, Handling of .22 rifle.

(c) **Unit 3. Map Reading (MR) (Contact Hrs. 03)**. Definition of Map, Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Magnetic Variation and Grid Convergence.

(d) **Unit 4. Field Craft & Battle Craft (FC & BC) (Contact Hrs. 03)**. Introduction of Field Craft & Battle craft, Judging Distance, Method of Judging Distance.

(e) **Unit 5. Social Service and Community Development (SSCD)(Contact Hrs.07)**.Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc.

SEMESTER II COURSE MODULE : NATIONAL CADET CORPS II

Course Title: National Cadet Corps II			
Course Code	**BNCC02GE03**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15+30**	**Course Duration**	**1 Semester**
Semester	**II (Even)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

56. **Course Objectives:** Cadets will be able to: -

(a) Understand the thinking & reasoning process.

(b) Understand the process to cope with Stress & emotions.

(c) Understand the importance of improving communication skills.

(d) Identify the leadership traits.

(e) Admire the qualities of great leaders.

(f) Know about different legal provisions for children & women safety and protection.

(g) Understand the various rules & measures to be taken to ensure Road/Rail safety.

(h) Understand & spread awareness about latest Government initiatives for welfare of citizens and contribute towards Nation building.

(i) Understand concepts of cyber and mobile security.

57. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Define thinking, reasoning, critical thinking and creative thinking.

(b) To think critically about different life related issues.

(c) Think divergently and will try to break functional fixedness.

(d) Creatively in their real-life problems.

(e) Understand the organizations related to disaster management and theirfunctioning.

(f) Appreciate the role of NCC cadets in disaster management.

58. Course Content Part (I) Theory

(a) Unit 1. Personality Development (Contact Hrs.5)

(i) Thinking- Meaning and Concept of thinking, Reasoning, Process of thinking.

(ii) Critical Thinking- Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking.

(iii) Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.

(b) Unit 2. Leadership Development (Contact Hrs.5)

(i) Leadership capsule.

(ii) Important Leadership traits, Indicators of leadership and evaluation.

(iii) Motivation- Meaning & concept, Types of motivation. Factors affecting motivation.

(iv) Ethics and Honor codes.

(c) Unit 3. Social Service and Community Development (Contact Hrs. 5)

(i) Protection of Children & Women Safety.

(ii) Road/Rail Safety.

(iii) New Government Initiatives.

(iv) Cyber and mobile Security Awareness.

Course Content Part (II) Practical

59. **Course Objectives**. Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of foot drill.

(c) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(d) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

60. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Perform foot drill gracefully.

(b) Give and follow the different word of command.

(c) Fire a weapon effectively with fair degree of marksmanship.

(d) Use of bearing and service protractor and locate the places and objects on the ground.

(e) Do the social service and feel connected with social problems.

61. Course Content Part (II) Practical

(a) Unit 1. Drill (Contact Hrs. 12)

(i) Foot Drill Dahine, Baen, Aageaur Piche Kadam Lena.

(ii) Tej Chal se Murdna, Tej Chal se Salute Karna, Tej Kadam Taal aur Tham, Tej Kadam Taal se Kadam Badalna.

(iii) Teeno Teen se Ek File aur ek file se Teeno Teen Banana

(b) Unit 2.Weapon Training(Contact Hrs. 04)

(i) Range procedure & Theory of group.

(ii) Short Range firing.

(c) Unit 3. Map Reading(Contact Hrs. 05)

(i) Protractor Bearing and its conversion methods.

(ii) Service protractor and its uses.

(iii) Prismatic compass and its uses and GPS.

(iv) Navigation by compass and GPS.

(d) Unit 4. Field Craft & Battle Craft (Contact Hrs. 04)

(i) Indications of landmarks and Targets.

(ii) Intro, Definitions, Types of Ground, Indication of Landmarks, Methods of iden of targets, difficult targets.

(e) **Unit 5.Social Service and Community Development(Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and state level.

SEMESTER III COURSE MODULE : NATIONAL CADET CORPS III

COURSE TITLE: NATIONAL CADET CORPS III			
Course Code	**BNCC03GE02**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15 +30**	**Course Duration**	**1 Semester**
Semester	**III (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

62. **Course Objectives**. Cadets will be able to: -

(a) Understand the life history and leadership qualities of great leaders, sportspersons & entrepreneurs.

(b) Understand the various aspects of types of mindset.

(c) Understand public speaking methods &qualities.

(d) Understand the organizations related to disaster management and their functioning.

(e) Understand the role of NCC cadets in disaster management.

(f) Understand the various types of adventure activities.

(g) Understand the History, Geography & Topography of Border/ Coastal Areas.

63. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Admire and get inspired from the accomplishments of leaders from various walks of life.

(b) Develop public speaking skills.

(c) Understand the importance of positive mindset and optimistic attitude in life.

(d) Appreciate the need & requirement for disaster management and his role in disaster management activities.

(e) Know the history & geographical peculiarity of our borders & coastal regions.

64. Course Content Part (I) Theory

(a) Unit 1. Personality Development (Contact Hrs.5)

(i) Group Discussions - Change your Mindset

(ii) Public Speaking.

(b) **Unit 2. Leadership Development (Contact Hrs.4)**.Case Studies– APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy.

(c) Unit 3. Disaster management(Contact Hrs. 3)

(i) Disaster Management Capsule.

(ii) Organisation.

(iii) Types of Disasters.

(iv) Essential Services.

(v) Assistance.

(vi) Civil Defence Organisation.

(d) **Adventure (Contact Hrs. 1)**.Adventure activities.

(e) **Border & Coastal Areas(Contact Hrs. 2)**. History, Geography & Topography of Border/ Coastal Areas.

Course Content Part (II) Practical

65. **Course Objectives**. Cadets will be able to : -

(a) Understand that drill as the foundation for discipline and to command a group for common goal

(b) Appreciate grace and dignity in the performance of arm drill

(c) Understand the concept and importance of social service.

(d) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(e) Actively participate in social service and community development activities.

66. **Expected Learning Outcomes**.After completing this course, the cadets will be able to: -

(a) Perform arm drill gracefully.

(b) Give and follow the different word of command.

(c) Fire a weapon effectively with fair degree of marksmanship.

(d) Different positioning for fire and aiming.

(e) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(f) Observe surroundings in better way.

(g) Develop the qualities of patience and confidence and become better individuals.

(h) Will develop physical as well as mental fitness.

67. Course Content Part (II) Practical

(a) Unit 1. Drill(Contact Hrs. 08)

(i) Arm Drill.

(ii) Rifle ke saath Savdhan, Vishram aur Aram se.

(iii) Rifle ke saath Parade Par aur Saj, Rifle ke saath Visarjan, Line Tod.

(iv) Bhumi Shastra aur Uthao Shastra, Bagal Shastra aur Baju Shastra.

(b) **Unit 2. Weapon Training(Contact Hrs. 04)**. Short Range firing.

(c) **Unit 3. Map Reading (Contact Hrs. 04)**.

(i) Setting of Map.

(ii) Findings North and Own Position.

(d) Unit 4. Field Craft & Battle Craft (Contact Hrs. 04)

(i) Observation.

(ii) Camouflage.

(iii) Concealment.

(e) **Unit 5. Social Service and Community Development (Contact Hrs. 05)**. Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) Unit 6. Obstacle Training(Contact Hrs. 05)

(i) Obstacle training - Introduction, Safety-measures, Benefits.

(ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall.

SEMESTER IV COURSE MODULE : NATIONAL CADET CORPS IV

Course Title: National Cadet Corps IV			
Course Code	BNCC04GE03	Credits	2(Thr)+ 1(Pr)=03
L /T + P	30+30	Course Duration	1 Semester
Semester	IV (Even)	Contact Hours	30(Thr)+30(Pr)=60Hours
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

68. **Course Objectives**. Cadets will be able to: -

(a) Develop a sense of time management and social skills.

(b) Understand the life history & leadership qualities of personalities who have contributed in Nation Building and Literature.

(c) Understand the role of NCC cadets as 2nd line Defence in 1965 War.

(d) Develop awareness about various types of Natural and manmade disasters.

(e) Know about life saving tips during disasters.

(f) acquainted about Fire Services.

(g) Understand importance of Environmental Awareness & conservation.

(i) Understand importance of General Awareness.

(j) Know about Armed Forces.

(c) **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(i) Effectively Manage time.

(ii) Develop the qualities of social skills.

(iii) Imbibe leadership qualities.

(iv) Do group discussions effectively.

(v) Be motivated to serve the nation by joining Armed forces.

(vi) Contribute in environmental awareness and conservation activities.

(vii) Keep abreast of current affairs & general awareness. (viii)Effectively contribute in managing disaster relief tasks.

69. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.4)**. Group Discussions – Social Skills & Time management.

(b) **Unit 2. Leadership Development (Contact Hrs.3)**.Case Studies – Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war.

(c) Unit 3. Disaster management(Contact Hrs. 10)

(i) Initiative Trg, Organising Skills.

(ii) Dos and Don'ts.

(iii) Natural Disasters.

(iv) Man Made Disasters.

(v) Fire Services and Fire Fighting.

(d) **Environmental Awareness (Contact Hrs. 3)**. Adventure Environmental Awareness and Conservation.

(e) **General Awareness (Contact Hrs. 4)**. General Awareness.

(f) **Armed Forces(Contact Hrs. 6)**.Army, Navy, Air Force and Central Armed Police Forces.

Course Content Part (II) Practical

70. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Understand various signals to convey messages in the army.

(c) Get acquainted various section formations.

(d) Understand the basics of personal and public hygiene.

(e) Get acquainted with the procedure to treat the wounds and fractures during emergencies.

71. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform weapon drill gracefully.

(b) Give and follow the different word of command.

(c) Appreciate grace and dignity in the performance of foot drill.

(d) Apply signals in there day to day functioning.

(e) Provide first aid during the emergencies.

(f) Navigate to the given location on ground using compass and GPS.

(g) Practice healthy practices for the personal sanitation and hygiene.

72. Course Content Part (II) Practical

(a) Unit 1. Drill (Contact Hrs. 08)

(i) Arm Drill.

(ii) Salami Shastra.

(iii) Squad Drill with Arms.

(b) **Unit 2. Weapon Training (Contact Hrs. 04)**. Short Range firing

(c) Unit 3. Map Reading(Contact Hrs. 04)

(i) Map to Ground.

(ii) Ground to Map.

(d) Unit 4. Field Craft & Battle Craft(Contact Hrs. 04)

(i) Fire and Move Capsule.

(ii) Field signal- with hand, with Weapons, Signal with Whistle.

(iii) Field signals as means of giving orders.

(iv) Field signals by day, Field signals by night.

(v) Section Formation.

(e) **Unit 5. Social Service and Community Development(Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) Unit 6. Health &Hygiene(Contact Hrs. 05)

(i) Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene).

(ii) First Aid in common medical emergencies.

(iii) Treatment & Care of Wounds.

SEMESTER V COURSE MODULE : NATIONAL CADET CORPS V

Course Title: National Cadet Corps V			
Course Code	**BNCC05GE02**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15 +30**	**Course Duration**	**1 Semester**
Semester	**V (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

73. **Course Objectives**. Cadets will be able to: -

(a) Understand the concept of Team and its functioning.

(b) Hone Public speaking skills.

(c) Understand the security set up amd management of Border/Coastal areas.

(d) Acquire knowledge about an Infantry Battalion organisation and its weapons.

(e) Acquire knowledge about Indo-Pak Wars fought in 1965 & 1971.

74. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Participate in team building exercise and value team work.

(b) Improve communication skills by public speaking activities.

(c) Understand the security mechanism and management of Border/Coastal areas.

(d) Get motivated to join armed forces.

75. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.6)**.

(i) Group Discussions –Team work.

(ii) Public speaking.

(b) **Unit 2. Border & Coastal Areas(Contact Hrs.2)**. Security Setup and Border/Coastal management in the area.

(c) **Unit 3. Introduction to Infantry Battalion and its Equipment(Contact Hrs. 3)**.

Organisation of Infantry Battalion & its weapons

(d) **Military History(Contact Hrs. 4)**. Study of Battles of Indo-Pak Wars 1965 & 1971.

Course Content Part (II) Practical

76. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of ceremonial drill.

(c) Use the compass and GPS to locate places on the ground and map.

77. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform ceremonial drill and follow the different word of command.

(b) Do the social service on various occasions and get connected with the community.

(c) Do all the asana and gain the physical& mental fitness.

78. Course Content Part (II) practical

(a) Unit 1. Drill(Contact Hrs. 03)

(i) Ceremonial Drill.

(ii) Guard Mounting.

(b) Unit 2. Field Craft & Battle Craft(Contact Hrs. 04)

(i) Fire control orders.

(ii) Types of fire control orders.

(iii) Fire and Movement- when to use fire and movements tactics, Basic considerations, Appreciation of ground cover, Types of cover, Dead ground, Common Mistakes, Map and air photography, Selection of Fire position and fire control.

(c) **Unit 3. Map Reading(Contact Hrs. 04)**.Google Maps & applications

(d) **Unit 4. Weapon Training(Contact Hrs. 04)**.Short Range firing

(e) **Unit 5. Social Service and Community Development (Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and State level.

(f) Unit 6. Health & Hygiene(Contact Hrs. 05)

(i) Yoga- Introduction, Definition, Purpose, Benefits.

(ii) Asanas-Padamsana, Siddhasana, Gyan Mudra, Surya Namaskar, Shavasana, Vajrasana, Dhanurasana, Chakrasana, Sarvaangasana, Halasana etc.

(g) Unit 7. Obstacle Training(Contact Hrs. 05)

(i) Obstacle training – Intro, Safety measures, Benefits.

(ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall etc.

SEMESTER VI COURSE MODULE : NATIONAL CADET CORPS VI

Course Title: National Cadet Corps VI			
Course Code	**BNCC06GE03**	**Credits**	**2(Thr)+ 1(Pr)=03**
L /T + P	**30 +30**	**Course Duration**	**1 Semester**
Semester	**VI (Even)**	**Contact Hours**	**30(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

79. **Course Objectives**. Cadets will be able to: -

(a) Get acquainted about counselling process its need and importance.

(b) Know about SSB procedure and different tasks and tests.

(c) Know about the conduction during the interview.

(d) Understand the security challenges & role of cadets in Border Areas.

(e) Know about the modes of entry in Armed forces, CAPF & police.

(f) Understand the life history & leadership qualities of great generals.

(g) Learn about 1999 Kargil war.

(h) Acquire the knowledge about various wars and their heroes.

(i) Know about various components of communication process.

80. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Get motivated to join Armed forces, police & CAPF.

(b) Write their CV effective and appealing.

(c) Face SSB interview effectively in their future.

(d) Understand individaul responsibilities & role in meetings the security challenges on Border/Coastal areas.

(e) Imbibe the feeling of patriotism.

(f) Communicate more effectively.

81. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.3)**.

(i) Career Counselling.

(ii) SSB Procedure.

(iii) Interview Skills.

(b) **Unit 2. Border & Coastal Areas(Contact Hrs.2)**. Security Challenges & Role of cadets in Border management.

(c) **Unit 3. Armed Forces(Contact Hrs. 3)**. Modes of Entry into Army, Police and CAPF.

(d) **Military History(Contact Hrs. 19)**.

(i) Biographies of Renowned Generals.

(ii) War Heroes : Param Veer Chakra Awardees.

(iii) Study of Battles of Kargil.

(iv) War Movies.

(e) **Communication(Contact Hrs. 3)**.Introduction to Communication & Latest Trends.

Course Content Part (II) Practical

82. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of ceremonial drill.

(c) Know about various knots and lashing used in soldiering.

(d) Acquire awareness about the basic weapon system in use in the Armed Forces.

83. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform foot drill and follow the different word of command.

(b) Aiming range and figure targets.

(c) Use the different knots and lashing in day-to-day life for different purposes.

(d) Develop the feeling of altruism.

84. **Course Content Part (II) Practical**.

(a) **Unit 1. Drill (Contact Hrs. 03)**.

(i) Ceremonial Drill.

(ii) Guard of Honour.

(b) **Unit 2. Weapon Training(WT) (Contact Hrs. 04)**.Short Range firing.

(c) **Unit 3. Map Reading(MR) (Contact Hrs. 04)**. Google maps and Applications.

(d) **Unit 4. Field Craft & Battle Craft(FCBC) (Contact Hrs. 03)**. Knots, Lashing and Stretchers.

(e) **Unit 5. Social Service and Community Development(SSCD) (Contact Hrs. 05)**. Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) **Unit 6 Introduction of Infantry Weapons &Equipment(INF) (Contact Hrs.03)**. Characteristics of 5.56MM INSAS Rifle, Ammunition, Fire Power, Stripping, Assembling & Cleaning Practice.

(g) Unit 7. Communication (COM) (Contact Hrs. 03).

(i) Basic Radio Telephony (RT) Procedure.

(ii) Introduction, Advantages, Disadvantages, Need for standard procedures.

(iii) Types of Radio telephony communication.

(iv) Radio telephony procedure, Documentation.

COURSE MODULE: NATIONAL CADET CORPS CAMP -I

Course Title: National Cadet Corps Camp I			
Course Code	**BNCCCAMP03GE05**	**Credits**	**2(Thr)+ 3(Pr)=05**
L /T + P	**30+90**	**Course Duration**	**10 Days (24 hours each)**
Semester	**III (Odd)**	**Contact Hours**	**30(Thr)+90(Pr)=120Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

85. **Course Objectives**.Cadets will be able to: -

(a) Acquire knowledge about the various aspects of personality development.

(b) Understand the concept of leadership traits, moral values and character traits.

(c) Develop awareness about the various types of natural disasters.

(d) Develop sensitivity to the changing environment and understand the importance of conservation.

(e) Understand the importance of hygiene and sanitation and common first aid procedures.

(f) Acquire awareness about various types of weapon systems in the Armed Forces.

86. **Expected Learning Outcomes**.After completing this course, the cadets will be able to: -

(a) Acquire adequate skill sets to overcome their weakness and reshape their personality.

(b) Imbibe good moral values and character traits in their daily life.

(c) Become useful members of the society and form part of disaster response team, if need arises.

(d) Respect and make efforts to conserve natural resources

(e) Follow good personal hygiene practices and provide first aid in emergencies.

(f) Be motivated to join the armed forces.

87. NCC Camp-I : Course Content Part (I) Theory

(a) **Unit 1. Personality Development (PD) (Contact Hrs. 04)**. Introduction to Personality Development, Factors influencing/shaping personality, Time Management and Interview Skills.

(b) **Unit 2. Leadership (LDR) (Contact Hrs. 04)**. Leadership Traits, Moral Values and Character Traits.

(c) **Unit 3. Disaster Management (DM) (Contact Hrs. 04)**. Assistance during natural disasters, Do's and Don'ts forNCC Cadets performing Disaster Management Duties

(d) **Unit 4. National Integration and Awareness (NIA)(Contact Hrs. 04)**. Water Conservation and Rain Harvesting, Waste Management an Energy Conservation

(e) **Unit 5. Health and Hygiene (H&H)(Contact Hrs. 04)**. Hygiene and Sanitation, First Aid in Common Medical Emergencies.

(f) **Unit 6. Infantry Weapons (IW) (Contact Hrs. 02)**. Characteristics of Company Support Weapons.

(g) Unit 7. Weapon Training (WT) (Contact Hrs. 04). Characteristics of Point 22 Rifle and its Ammunition, Range Procedure and Safety Precautions**.**

(h) **Unit 8. Military History (MH) (Contact Hrs. 04)**. Guest lectures by War Veterans/decorated soldiers/veterans.

(i) **Unit 9.Communication (COM) (Contact Hrs. 04)**. Basics of communication.

NCC Camp-I : Course Content Part (II) Practical

88. **Course Objectives**. Cadets will be able to: -

(a) Understand that drill is the foundation of discipline and command a group for a common goal.

(b) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(c) Develop awareness about different types of terrain and how it is used in Battle Craft.

(d) Develop the concept of various markings on the map and how they are co-related to the ground features.

(e) Acquire awareness about the various types of weapon systems in the Armed Forces.

(f) Understand the concept and importance of social service.

(g) Understand the various nuances of Personality Development.

(h) Understand the concept and importance of Physical Training in everyone's life.

(i) Acquire skill sets about various games and understand the importance of team work.

(j) Develop awareness about different cultures and different modes of its projection in artistic forms.

89. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Perform foot drill, arms drill, ceremonial drill and will be able to give out different words of command.

(b) Fire a weapon effectively with fair degree of marksmanship.

(c) Undertake point to point navigation and take part in route marches by day and night.

(d) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(e) Be motivated to join the armed forces.

(f) Acquire adequate skill sets to overcome their weakness and enhance their personality.

(g) Gain adequate physical and mental endurance capabilities.

(h) Play team games and be able to communicate and coordinate effectively in group events or situations.

(i) Respect the diversity of Indian culture and develop pride by showcasing their own culture to others.

90. NCC Camp-I : Course Content Part (II) Practical

(a) **Unit 1. Drill (Drill)(Contact Hrs. 16)**. Drill ki Aam Hidayaten aur Words of Command, Savdhan, Vishram, Aram Se aur Mudna, Khuli Line aur Nikat Line mein march, Salute Karna Parade Par, Visarjan aur Line Tod, Tej Chal, Tham aur Dhire Chal, Tham, Dahine, Baen, Aage aur Piche Kadam lena, Tejchaal se Mudna, Tejchaal se Salute karna, Tej kadamtaal aur Tham, Tej Kadamtaal se kadam badhana, Teenon Teen se ek file Banana aur ek file se Teenon Teen Banana, Rifle Ke Saath Saavdhan, Vishram aur Aaram se, Rifle ke saath Parade par aur saaj, Rifle Ke saath visarjan aur line tod, Bhumi Sashtra aur Uthao Sashtra, Bagal Sashtra aur Baaju Shastra.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 14)**. Stripping, Assembling, Cleaning of Point 22 rifle, Sight Setting and Sight Picture of Point 22 Rifle, Loading, Cocking and Unloading, Lying Position, Holding and Aiming of Point 22 rifle, Trigger Control and Firing of Shot, Theory of Group, Short-Range Aiming and Firing, Firing Practice I to VII.

(c) **Unit 3. Field Craft & Battle Craft (FC/BC) (Contact Hrs. 06)**.Introduction of Field Craft & Battle craft, Judging Distance, Indication of Landmarks and Targets, Observation, Camouflage and Concealment, Field Signals, Section formations.

(d) **Unit 4. Map Reading (MR) (Contact Hrs. 12)**. Introduction to Map and Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Types of Bearing and use of Service Protector, Prismatic Compass and its use, setting of a map, Finding North and own Position, Map to Ground and Ground to map, Point to Point march, Route March – I, Route March -II.

(e) **Unit 5. Infantry Weapons (IW) (Contact Hrs. 01)**. Characteristics of Battalion Support Weapons.

(f) **Unit 6. Social Service and Community Development (SSCD) (Contact Hrs. 04)**. Basics of Social Service and its need, Rural Development Programme, Civic Responsibilities: Cadets will participate in various activities throughout the camp e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc., Road /Rail Travel Safety

(g) **Unit 7. Personality Development (PD) (Contact Hrs. 06)**.Self-Awareness, Empathy, Critical and Creative Thinking, Decision making and problem Solving, Coping with Stress and

Emotions, Time Management.

(h) **Unit 8. Obstacle Training (OT) (Contact Hrs. 02)**. OT Practice – I:- Untimed, Cadets will be familiarized with all the obstacles in the Obstacle Course and briefed about the correct method to do them, OT Practice -II: Timed practice for all the cadets and record to be maintained.

(i) **Unit 9. Physical Training (PT) (Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in morning hours. Training has to be progressive in degree of difficulty to improve individual stamina and endurance. Training to include warming up, running, exercises to strengthen upper body, lower body and core muscles. Two period each to be devoted to route march by day and night respectively and one period will be earmarked for trekking expedition as part of Adventure Activity.

(j) **Unit 10. Games Training (G)(Contact Hrs. 09)**. Games Training will be carried out on each day of the camp, except on last day, in evening hours. Training has to be progressive in degree of difficulty to improve individual skills, coordination, team work and desire to excel. Training to ensure that each and every boy and girl cadets participate in at least one game activity everyday.

(k) **Unit 11. Cultural Activity (C)(Contact Hrs. 09)**. Cultural Activity will be carried out on each day of the camp, except on last day, in evening hours. Cadets have to divided in Nine Groups consisting of a mix of boy and girl cadets and preferably belonging to the same geographical area. Each group has to present the unique culture, custom, tradition, folk lore, songs, drama, paintings and cuisine during one hour allotted. There will be a prize for the best group to encourage participation and to develop pride in their unique culture. This training activity should ensure that each and every boy and girl cadet participate in at least one game activity every-day.

(l) **Unit 12. Spare (S)(Contact Hrs. 02)**. Two periods in each camp will be earmarked as spare to cover disruptions in training activity due to weather or other administrative reasons.

COURSE MODULE : NATIONAL CADET CORPS CAMP – II

Course Title: National Cadet Corps Camp II			
Course Code	**BNCCCAMP05GE05**	**Credits**	**2(Thr)+ 3(Pr)=05**
L /T + P	**30+90**	**Course Duration**	**10 Days (24 hours each)**
Semester	**V (Odd)**	**Contact Hours**	**30(Thr)+90(Pr)=120Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (II) Theory

91. **Course Objectives**.Cadets will be able to: -

(a) Acquire the concept self-awareness, emotional intelligence, critical and creative thinking, decision making and problem solving.

(b) Learn about various indicators of good leadership and get an insight on principle of leadership and motivation.

(c) Develop awareness about the various types of natural disasters and disaster management organization in our country.

(d) Familiarize with natural resources, changing environment and understand the importance of conservation and waste management.

(e) Value the importance of Physical and Mental health and understand how to deal with wounds of various types.

(f) Acquire awareness about organization and role of an Infantry Battalion in the Armed Forces.

92. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Develop a sense of responsibility, smartness in appearance and improve self-confidence, inculcate importance of empathizing with others, improve their deep-thinking ability and apply ideas and be able to face problems in a constructive manner with solutions.

(b) Imbibe good leadership traits and apply them in practical life and appreciate the visible outcome of leadership and motivation.

(c) Appreciate role of the org during emergency and become useful members of disaster response team, if need arises.

(d) Learn about the various natural resources, their utilization and practice method of conservation of these resources in daily life.

(e) Appreciate value of physical and mental health in daily life and spread awareness about treatment and care of wounds in their society.

(f) Be motivated to join the armed forces.

93. **NCC Camp-II : Course Content Part (I) Theory**.

(a) **Unit 1. Personality Development (PD) (Contact Hrs. 04)**.Self-Awareness, Emotional intelligence, Critical and Creative Thinking, Decision-Making and Problem Solving.

(b) **Unit 2. Leadership (LDR) (Contact Hrs. 02)**. Indicators of Good Leadership, Leadership and Motivation.

(c) **Unit 3. Disaster Management (DM) (Contact Hrs. 02)**. Disaster Management Organization NDMA and NDRF, Types of Disasters.

(d) **Unit 4. Environmental Awareness and Conservation (EAC) (Contact Hrs. 02)**. Natural Resources, Conservation and Management, Water Conservation, Waste Management, Energy Conservation.

(e) **Unit 5. Health and Hygiene (H&H) (Contact Hrs. 02)**. Physical and Mental Health, Treatment and Care of Wounds.

(f) **Unit 6. Infantry Weapons (IW) (Contact Hrs. 01)**. Organization of Infantry Battalion.

(g) **Unit 7. Weapon Training (WT) (Contact Hrs. 02)**. Characteristics of Point 22 Rifle and its Ammunition, Range Procedure and Safety Precautions.

(h) **Unit 8. Military History (MH) (Contact Hrs. 04)**. Guest lectures by War Veterans/decorated soldiers/veterans.

(i) **Unit 9. Communication (COM) (Contact Hrs. 04)**. Latest trends in communication.

NCC Camp-II : Course Content Part (II) Practical

94. **Course Objectives**. Cadets will be able to: -

(a) Inculcate spirit of discipline and follow command as a group for a common goal.

(b) Fire a weapon with adequate safety precautions necessary for safe firing.

(c) Understand the lay of the ground and use it skillfully towards own objective.

(d) Understand and use the map, satellite imagery and GPS effectively.

(e) Identify and be well versed with the primary weapom systems used in the Armed Forces.

(f) Lead a life of selflessness and provide service towards society development and nation building.

(g) Understand the importance of changing mindset, team work, social skills etiquettes and manners, interview skills and importance of effective communication in daily life.

(h) Learn the importance of physical fitness and nuances of physical training.

(i) Inculcate esprit-de-corps through team games.

(j) Have knowledge about cultural diversity of India and learn ways and means to adopt them.

95. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Practice problem solving, critical thinking in real life situations.

(b) Practice leadership of small teams and groups under challenging environment.

(c) Develop a positive attitude, have manners and etiquettes in social life, develop a sense of cooperation for group or team work, participate in an interview with confidence and inculcate verbal and non-verbal communication skills.

(d) Develop adequate physical and mental endurance capabilities.

(e) Fire a weapon effectively with fair degree of marksmanship.

(f) Undertake point to point navigation and take part in endurance marches by day and night.

(g) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(h) Be motivated to join the Armed Forces.

(i) Play team games and be able to communicate and coordinate effectively in group events or situations.

(j) Perform foot drill, arms drill, ceremonial drill and will be able to take part in ceremonial parade and events.

(k) Respect the diversity of indian culture and develop pride by showcasing their own culture to others.

96. NCC Camp-II : Course Content Part (II) Practical

(a) **Unit 1. Drill (Drill) (Contact Hrs. 16)**. Tejchaal se Mudna, Tejchaal se Salute karna, Tej kadamtaal aur Tham, Tej Kadamtaal se kadam badhana, Teenon Teen se ek file Banana aur ek file se Teenon Teen Banana, Rifle Ke Saath Saavdhan, Aaram se, Rifle ke saath Parade par aur saaj, Rifle Ke saath visarjanaur line tod, Bhumi Sashtra aur Uthao Sashtra, Bagal Sashtra aur Baaju Shastra, Salami Sashtra, Squad Drill, Guard Mounting, Guard of Honour, Platoon / Company Drill, Word of Command and Instructional Practice.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 14)**. Stripping, Assembling, Cleaning of Point 22 rifle, Sight Setting and Sight Picture of Point 22 Rifle, Loading, Cocking and Unloading, Lying Position, Holding and Aiming of Point 22 rifle, Trigger Control and Firing of Shot, Theory of Group, Short-Range Aiming and Firing, Musketry Training, Firing Practice I to VII.

(c) **Unit 3. Field Craft & Battle Craft (FC/BC) (Contact Hrs. 06)**. Observation, Camouflage and Concealment, Field Signals, Section formations, Fire Control Orders, Fire and Movement, Knots and Lashings.

(d) **Unit 4. Map Reading (MR) (Contact Hrs. 12)**. Introduction to Map and Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Types of Bearing and use of Service Protector, Prismatic Compass and its use, setting of a map, Finding North and own Position, Map to Ground and Ground to map, Point to Point march, Endurance March – I (10 KM), Endurance March -II (20 KM).

(e) **Unit 5. Infantry Weapons (IW) (Contact Hrs. 01)**. Characteristics of Infantry Company support weapons and 5.56 MM INSAS Rifle.

(f) **Unit 6. Social Service and Community Development (SSCD)(Contact Hrs. 04)**. Contribution of Youth Towards Social Welfare: Cadets will participate in various activities throughout the camp e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc., Social Evils: Female Feticide, Dowry, Child Abuse, Trafficking and Corruption, Drug Abuse and Drug Trafficking, Protection of Children and POCSO Act 2012.

(g) **Unit 7. Personality Development (PD)(Contact Hrs. 06)**. Change Your Mindset, Team Work and Team Building, Social Skills, Etiquettes and Manners, Interview Skills, Communication Skills–I, Communication Skills -II

(h) **Unit 8. Obstacle Training (OT)(Contact Hrs. 02)**. OT Practice – I: Untimed, Cadets will be familiarized with all the obstacles in the Obstacle Course and briefed about the correct method to do them, OT Practice -II: Timed practice for all the cadets and record to be maintained.

(i) **Unit 9. Physical Training (PT) (Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in morning hours. Training has to be progressive in degree of difficulty to improve individual stamina and endurance. Training to include warming up, running, exercises to strengthen upper body, lower body and core muscles. Two period each to be devoted to route march by day and night respectively and one period will be earmarked for trekking expedition as part of Adventure Activity.

(j) **Unit 10. Games Training (G)(Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in evening hours. Training has to be progressive in degree of difficulty to improve individual skills, coordination, team work and desire to excel. Training to ensure that each and every boy and girl cadets participate in at least one game activity everyday

(k) **Unit 11. Cultural Activity (C) (Contact Hrs. 09)**. Cultural Activity will be carried out on each day of the camp, except on last day, in evening hours. Cadets have to divided in Nine Groups consisting of a mix of boy and girl cadets and preferably belonging to the same geographical area. Each group has to present the unique culture, custom, tradition, folk lore, songs, drama, paintings and cuisine during one hour allotted. There will be a prize for the best group to encourage participation and to develop pride in their unique culture. This training activity should ensure that each and every boy and girl cadets participate in at least one game activity every day (Contact Hrs. 09)

(l) **Unit 12. Spare (S) (Contact Hrs. 02)**. Two periods in each camp will be earmarked as spare to cover disruptions in training activity due to weather or other administrative reasons.

SECTION II : RULES AND REGULATIONS

GOVERNING NCC CREDIT COURSE UNDER CHOICE BASED CREDIT SYSTEM AS GENERIC ELECTIVE FOR SENIOR DIVISION/WING

RULE 1 :Definitions of Key Terms

General Definitions

'Choice Based Credit System' (CBCS).The CBCS provides choice for the student to select courses from the prescribed courses (Elective or Soft – Skill courses). It provides a 'Cafeteria' approach in which the students can take courses of their choice, learn at their own pace, study additional courses and acquire more than the minimum required credits, and adopt an inter-disciplinary approach.

'Academic Year'.Two consecutive (one odd + one even) semesters shall constitute one academic year.

'Credit Course'.Course, usually referred to as paper having specific title and code number, is a component of a programme. It consists of a list of topics/concepts/theories/principles/activities/tasks etc. which a student has to learn during the programme of study. Each course has some credits according to the nature and load of content. Each course should define the learning objectives/learning outcomes. A course may be designed to be delivered through lectures/tutorials/laboratory work/field work/out reach activities/project work / vocational training / physical training /viva / seminars /term papers / assignments / presentations / self-study work etc., or a combination of some of these.

'Course Instructor/Teacher'.The course instructor generally will be a teaching faculty who has taken up the responsibility of teaching it and evaluating the performance of the students in that course. NCC course will be imparted by the ANO (Associate NCC Officer) and PI (Permanent Instructor) / Girl Cadet Instructor (GCI) staff together according to their area of specialization. Certain specific topics and training activity is imparted by Military Officers and Whole Time Lady (WTLO).

'Credit'.A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work per week. Thus, in each semester's NCC course, credits are assigned on the basis of the number of lecture/tutorial/field work/physical training/excursions and other forms of learning required for completing the contents in a 15-18 week schedule. 2 hours of laboratory work/field work is generally considered equivalent to 1 hour of lecture.

i. 1 credit = 1 hour of instruction per week (1 credit course = 15 contact hours of instruction per semester)

ii. 4 credit = 4 hour of instruction per week (4 credit course = 60 contact hours of instruction per semester)

iii. 1 credit = 2 hour of practical per week (1 credit course = 30 contact hours of instruction per semester)

iv. 4 credit = 8 hour of practical per week (4 credit course = 120 contact hours of instruction per semester)

Number(s) of credit(s) assigned to a particular course are mentioned in the detailed syllabus of the courses.

'Credit Point'.It is the product of the grade point and the number of credits for a course.

'Letter Grade'.It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P, and F. A letter grade is assigned to a student on the basis of evaluation of her/his performance in a course on a ten-point scale.

'Grade Point'.It is a numerical weight allotted to each letter grade on a 10 -point scale.

Letter Grade	Grade Point
O	9-10
A+	8-9
A	7-8
B+	6-7
B	5-6
C	4-5
P	4
F	0
Ab	0

Note : University may use the above said criteria for providing the grades to the students or may adopt the same criteria which they are practicing for providing the letter grade and grade point for other subjects.

'Programme'.An educational programme leading to the award of degree, Diploma or Certificate course.

NCC course shall be offered only at under graduate level programmes for any stream or type of programme for example – Nonprofessional courses BA, B.SC. B. Com etc. professional courses – B.A., LLB, B.A./B.Sc., B.Ed., BCA, BBA, B. Tech, MBBS etc.

'Credit – Based Semester System (CBSS)'.Under the CBSS, the requirement of awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.

'Semester'.Each semester shall consist of 15 to 16 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June. The Credit-based semester system provides flexibility in designing curriculum and assessing credits based on the course content and hrs of teaching.

'Semester Grade-Point Average (SGPA)'. Semester Grade Point Average or SGPA, is an average grade point earned by the student at the end of an academic session i.e. semester at college. The formula for calculation of SGPA is the sum of all the credit points awarded for the subjects divided by total credits allotted to that semester. It shall be expressed up to two decimal places.

'Cumulative Grade Point (CGPA)'. It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all the semesters. It shall be expressed up to two decimal places.

'Transcript/ Grade card or certificate'. Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade and / or marks secured) along with SGPA of semester. Overall Grade Certificate will be issued on completion of the course showing semester wise SGPA & CGPA.

'The University/ College/ Institution'. The University/ College/ Institution in present document means the any recognized central/ state/ Deemed university or institution meant for higher education.

'NCC Course'. In the present document 'NCC Course' means the course designed for imparting NCC curriculum in educational institutions as elaborated in this document under Choice Based Credit System as a General Elective Course for Senior Division/ Senior Wing.

Definitions Specific to NCC

'Institutional Training'. Implies training conducted for NCC cadets as per Training Manuals and Cadet Hand Book issued by DG NCC, Ministry of Defence.

'Common Subjects'. Implies those subjects specifically taught in NCC curriculum which are common to Army, Navy and Air Force and general training that can be imparted by Associate NCC Officers or Military staff or a suitably qualified person.

'Specialised Subjects'. Implies subjects specifically taught in NCC curriculum by military instructors comprising specialised topics for Army, Navy and Air Force Cadets respectively.

'NCC Camps and Centralised Training Events'. Collective training events conducted usually for 10 days with large number of cadets living under field conditions in selected places away from home. The training camp comprises of focused physical and mental training routines of different types as per syllabus and curriculum. Some training like route marches may happen overnight. Camps include, adventure camps, national integration camps,

Republic Day Parade Training Camps, ThalSainik, VayuSainik and NauSaink camps and other outdoor training activities as described in DG NCC Training Manuals.

NCC 'B' and 'C' Certificate Examinations. These are defined in Special National Cadet Corps Order 2020 issued by DG NCC, Ministry of Defence.

'Training Faculty'.Persons suitably trained & responsible for imparting training of different types and nature to students.

'Military Officers'. They are regular commissioned officers of Indian Armed Forces who serve in the NCC and render command, administrative and instructional functions for NCC.

'Whole Time Lady Officers (WTLO)'. They are women officers commissioned directly into the NCC.

'Associate NCC Officer (ANO)'. ANO will be a university/ college/ school faculty who are qualified in the PRCN (Pre-commission Course of NCC) conducted by DGNCC and are commissioned as Associate Officers in NCC as defined in NCC Act 1948 and NCC Rules. They have the eligibility to impart certain component of NCC Course and undertake training of cadets.

'Permanent Instructor (PI)'. PI Staff are Junior Commissioned Officers (JCO) and Non-Commissioned Officers (NCO) on deputation from Armed Forces to NCC as governed by NCC Act 1948. Retired PI Staff may be hired by a college as a substitute for ANO with prior concurrence of DGNCC.

'Girl Cadet Instructors (GCI)'. GCI are lady instructors' equivalent to PI Staff for specifically imparting instructions to women NCC cadets of Senior Wing.

'NCC Organizational Structure'. NCC is an adjunct of Indian Armed Forces that operates under the ambit of the Ministry of Defence through the Defence Secretary with Raksha Mantri as the political head.

'DGNCC'.Directorate General of NCC renders the command and administrative function of NCC. The executive head of NCC is Director General of NCC who is a Lt Gen rank officer from the Army.

'State NCC Directorate'. State NCC Directorates are directorates subordinate to DG NCC and render command and administrative control to NCC at State level and is headed by an Additional or Deputy Director General

'NCC Group HQ'. NCC Group HQs are subordinate to State Directorates and render command and administrative control to NCC at district or cluster of districts in a state and is headed by a Group Commander.

‘NCC Units’. NCC Units are subordinate to Group HQs at the lowest rung of the command and administrative control exercised by military officers and is headed by a Commanding Officer or Officer Commanding. The NCC Units directly engage with educational institutions and ANOs and are primarily responsible for training of NCC in institutions under their jurisdiction.

‘NCC Division/ Wing’. NCC Division/Wing are minor units of senior division/wing of NCC comprising of 160 senior cadets allotted to educational institutions. It can be further subdivided into NCC platoons of 53 to 54 cadets.

‘NCC Troop’. NCC Troop are minor units of junior division/wing of NCC comprising of 100 junior cadets allotted to educational institutions. It can be further subdivided into NCC half troops comprising of 50 junior cadets.

RULE 2 : Admission and Other Provisions

The NCC Course under the CBCS as ‘General Elective’ shall be of three years (Six Semester) duration which may be completed in maximum duration of four year (8 semesters).

Students may complete NCC course minimum in Six semesters and maximum in eight semesters. Cadets may complete their ‘B’ Certificate in four semesters minimum and maximum six semesters. Cadets already having ‘B’ certificate may complete their ‘C’ certificate in minimum two semesters and maximum four semesters, and they may join NCC course 5 in first semester of college.

The intake to the course shall be decided according to the seats allotted to University/ college/ institution by DG NCC according to the availability of required infrastructure, faculty and resources.

The admission to the NCC Course under the CBCS as a ‘General Elective’ shall be governed by the provisions as laid down by the NCC Act 1948/ SNCCO 2020/ contemporary SNCCO and Academic council of parallel body of university. These rules and regulations may be modified from time to time (if needed) by the Academic body of the university in consultation with DG NCC or Act/ Ordinances prepared by DG NCC.

Students will be enrolled as NCC cadet as per existing Acts & Rules.

At the time of reporting for admission, the candidates are required to present medical & physical fitness documents as well as the admission proof of the university and submit the self-attested copies of aforesaid documents.

The admission of any candidate is liable to be cancelled without giving any further notice forthwith or at any time during the period of the course, if it is detected that the candidate has/had produced fake/forged certificate (s)/ document(s), indulged in any act of misconduct/indiscipline and has/had concealed any other relevant information at the time of admission.

The admission of the candidate to the course shall be subject to such ordinance, rules and regulations as

may be framed from time to time by the university in consultation with DG NCC and NCC act 1948.

DG NCC shall have jurisdiction in case of any dispute relating to the provisional admission in the course.

RULE3 : For Eligibility, Medium of Instrs & Categories

Eligibility Conditions. Be governed by provisions of NCC Act and Rules and directions from DG NCC from time to time. These are readily available on DG NCC website www.nccindia.nic.in.

Standards for physical Fitness criteria for Male and Female Cadets/students shall be governed by provisions of NCC Act and Rules and policy documents released by DG NCC from time to time.

RULE4 : Medium of Instruction. English or Hindi. However, ANOs and training instructors are free to use vernacular language for helping students who are not fluent in Hindi or English.

RULE 5 : Course and Students. NCC course is unique, due to the nature of its military training content and component hence it is normally offered to students enrolled as NCC cadets only. This NCC Course is primarily designed for students enrolled as NCC cadets under provisions of NCC Act 1948. Institution allotted NCC will have the obligation to offer this course to all students from their institute enrolled as cadets as per vacancy allotted to the institution by DG NCC as also to those cadets enrolled under Open Quota seats.

RULES 6 :NCC Course for 'Cadet' Category 6.1. NCC Course for 'Cadet'

(a) NCC course for Cadets comprises of total 24 credits (08 for theory, 06 for practical and 10 for camp component) over 6 semesters courses i.e., NCC course I to NCC course VI and NCC Camp I & NCC Camp II.

(b) Cadets will not only earn the academic credits but also be given 'B', and 'C' Certificates after passing the exam conducted by DG NCC.

(c) Students would be free to join NCC Course I or subsequent Courses in any semester, not necessarily Semester I or the designated Semester.

(d) A student can opt for only one of the six Courses per semester and that too sequentially implying NCC Course II cannot be joined before completing NCC Course I and so on.

(e) Under this category a fresh student/cadet will compulsorily have to opt for all six NCC Courses in minimum six Semesters. However, 'B' certificate holder may directly join NCC Course Number 5 in any semester. He will have to complete NCC Course Number 5 and NCC Course Number 6 for obtaining 'C' certificate and he will be awarded credit points only for NCC Course Number 5 and NCC Course Number 6.

NCC GENERAL ELECTIVE CREDIT COURSE DESIGN SUMMARY					
Semester	Credits Allocated			Total	Remarks
	Theory	Practical	Camp		
Semester - I	1	1		2	
Semester - II	1	1		2	
Semester – III	1	1	5	7	Credits of 1st Camp merged with 3rd Sem
Semester – IV	2	1		3	
Semester – V	1	1	5	7	Credits of 2nd Camp merged with 5th Sem
Semester - VI	2	1		3	
Total	**08**	**6**	**10**	**24**	**Twenty-Four Credits**

RULE 7 :Mobility& Credit Bank

The mobility shall be permissible from the regular mode programme to the regular mode programme of learning only and cannot be replaced by open/distance/online programme.

It shall be the responsibility of the student to assess the feasibility and practicality of vertical mobility (across the Universities), as it doesn't entitle a student to be exempted or relaxed from any of the requisites (sessional, attendance, assignments, End-semester examinations and programme duration etc.) for completing the course.

After completing one semester/ one year cadet/student may pursue NCC course from any other institution/ University/ College having NCC and carry credits in credit bank as per NEP 2020. The NCC students/ Cadets of some other university shall in any case be admitted only at the beginning of the session to the fulfilment of the other requirements of the NCC Course (attendance, Formative assessment, Field-work, practical etc).

A student of NCC course availing inter-university mobility shall continue to be a bonafide student of the university where he/she initially got admission and as per the university/ Institutional rules for the inter-university mobility.

In case of inter-university mobility of NCC cadet for NCC Course is also the subject to availability of NCC for the cadets in that particular university/ institution and it shall be interpreted as inter-battalion migration (means another regimental no. shall be allotted to the cadet).

RULE 8 :Examination & Promotion

The examination of all the NCC courses shall be internal in nature and generally consisting of continuous internal assessment and End of semester Examination. For the preparation of final grade in a particular course, the continuous internal assessment (Formative in nature) and the End Semester Examination (Summative in nature) shall have the weightage as decided for other courses by the university as per the University norms for e.g., 25% internal assessment and 75% End of term exams or 30% internal assessment and 70% End of term exams etc.

For assigning the Grades and credit points to NCC Course Universities/ Institutions are free to use the same criteria which are decided by their academic bodies for providing the grades and credit points to the other courses

RULE 9 :Continuous Internal Assessment

The Continuous Internal Assessment of the NCC Cadets' and NCC students' learning and performance shall be carried out by the ANOs and PI staff.

Continuous Internal Assessment will be 100% Practical that includes Drill Square test, Map Reading, Weapon Training, Field craft & Battle craft.

CO of nominated NCC Unit will be deemed as Head of the Department and shall be responsible for approving the schedule and pattern of the continuous internal examination.

ANO of the nominated institute shall maintain all the records related to attendance, teaching and assessment in a systematic manner, including award of final grade.

In case a student fails to appear in any Continuous Internal Assessment, they will be given a chance to reappear in retest and in case he/she fails to obtain 'P' grade he/she will be made to repeat the exam by carrying it forward for semester retest .

RULE 10 :Re-appear in the End Semester Examination for Improvement of Grades

If a student wishes to improve her/his grade(s) in NCC course(s), she/he can re-appear in the End Semester Examination in the subsequent odd/even semester(s), whenever the examination of the particular course(s) is held, on payment of fees in addition to the prescribed semester fee within the maximum permissible duration for the programme of study of the student/cadet.

A student may improve her/his points/grade by reappearing in the End Semester Examination of a course as per the provisions of reappearing mentioned above. In such cases points obtained by the student in the Continuous Internal Assessment of the particular course shall be carried forward to the subsequent End Semester Examination of the course. However, in such case, the points/grades obtained on the basis of latest appeared End Semester Examination shall be considered for calculation of final CGPA of the programme.

The re-appear examination of a course for improvement of grade shall be based on the syllabi of the course in force at the time of initial registration to the course.

A student who has got the Migration/Transfer Certificate issued from the University shall not be allowed to re-appear in any examination for improvement of grade.

RULE 11 :Repeating Courses

A student having attendance shortage in any course may repeat the course by taking re-admission in that course in subsequent odd/even semester(s), whenever the course is being offered, within the maximum permissible duration of the programme.

If a student repeats a course, she/he has to fulfil all the desired requirements afresh including attendance, Continuous Internal Assessment and the End Semester Examination. In such case the course content shall be based on the syllabi of the course in force at the time of repetition of the course.

RULE 12 : Promotion Rules

A student shall be declared as 'promoted' to the next semester when she/he earns 'P' Grade or above in the last concluded semester examination, maintaining the spirit and pattern of semester system and covering the mandatory components, such as Continuous Internal Assessment and End-Semester Examination in the NCC Courses.

A student shall be 'Provisionally Promoted' to the next semester if she/he secures less than 'P' grade but he /she has to pass all the courses of NCC course within permissible duration.

A cadet shall be eligible to attend the 'B' Certificate exam if he/she passed all the first four semester NCC course and completed one ATC/CATC. Similarly, cadet will be eligible to attend 'C' certificate examination if he/she has 'B' certificate and he /she has passed V, VI semester NCC course and attended one CATC/ATC after fourth semester and after having obtained 'B' certificate.

If a cadet/student is repeating a course in an academic session, whatever may be the reason, it shall not be counted in the total number of seats and shall not affect the fresh intake of cadets / student in that academic session.

RULE 13 :Computation of SGPA & CGPA

13. Computation of SGPA and CGPA . University may use their own criteria for giving the SGPA & CGPA which is prepared by the authorised academic body for the other courses.

Course Title: National Service Scheme

Semester IV

Youth and crime

Sociological and psychological factors influencing youth crime, cyber crime, pear mentoring in preventing crime and awareness for juvenile justice

Civil/self defence

Civil defence services, aims and objectives of civil defence; needs and training of self defence

Resource mobilisation

Writing a project proposal of self fund units (SFUs) and its establishment

Additional life skills

Positive thinking, self confidence and esteem, setting life goals and working to achieve them, management of stress including time management.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

SUBJECT CODE – MC 4 (C)

CATEGORY – NNP

SUBJECT NAME – PHYSICAL EDUCATION

SEMESTER – IV

ENGLISH II

UNIT-I

1. Vocabulary

Homonyms

Foreign words & phrases commonly used

Proverbs

Idioms

One word substitution

UNIT-II

2. Grammar

Tenses

Direct Indirect

Active passive

Simple, Compound, Complex

Punctuation

UNIT-III

3. Correspondence

Business letters

Application for job

Resume, Curriculum Vita, Bio-data

Report writing on completion of events

Agenda

Minutes

UNIT-IV

4. Comprehension of unseen & seen passages.

Essay writing (500 words) about any sports tournament/Event.

News writing about any Match or sports event.

Interview- when how,types if interview.

UNIT-V

5. Text

Tales from freedom fights of India.

Binging of Freedom fight 1857 to 1900

Mahatma Gandhi and freedom Fight

Netaji Shubhas Chand Bose and Freedom fight.

Dissolve of various kingdom in India.

After 1947 Fights of India Short Stories freedom of Goa, India China, India - Pakistan, India - Pakistan 71, Kargilwar.

EDUCATIONAL TECHNOLOGY

UNIT-I

1.1 Introduction to Educational Technology

Definition

Educative Process

The Teacher of Yesterday & Today

An outline of Teaching method used then and now

Use of sensory organ in the process of learning and remembering.

Communication:

Types of Communication

Communication Cycle

Communication in the Class room

UNIT-II

2. Teaching Aids:

Importance of Teaching Aids.

Criteria for selecting Teaching Aid

Difference between Teaching Method and Teaching Aid.

Broad classification of Teaching Aids.

Audio Aids

Visual Aids

Audio-Visual Aids

Effectiveness of Edger Dale's cone classification

Advantage and suggestions for effective use of selected teaching Aids.

Verbal

Chock Board

Charts

Models

Slide Projector

Over Head Projector

Motion Picture

Self Experiment and Projects.

3. New Teaching Techniques and Innovations-I:

Art of questioning and answering

Purpose of Questioning

Classification of Questioning

Techniques of asking questions

Programmed Learning

Concept of Programmed learning

Fundamental Principles of Programmed learning

Steps involved in preparation of Programme

Team Teaching

Meaning

Guiding principles of Team Teaching

Advantage of Team Teaching.

UNIT-IV

4. New Teaching Techniques and INNOVATIONS-II:

Micro Teaching

Concept and Features of Micro Teaching.

Micro Teaching Verses Traditional Teaching

Steps in Micro Teaching

Principles of Micro Teaching

Micro Teaching Skills

Limitation of Micro Teaching

Simulation Teaching

Meaning of Simulation

Types of activities in simulation

Steps in Simulation

Advantages of Simulation

Limitations of Simulation

System Approach

Definition of System

Components of an instructional system

Flow Diagram for designing a system

Advantages of system approach

Teaching Machines

Meaning of teaching machines

Components of an instructional system

Flow Diagram for designing a system

Computer-Assisted Instruction.

WRESTLING

1. Introduction of the Wrestling and historical development with special reference to India.
2. Important tournaments help at National and International levels and distinguished personalities related to the game.
3. Fundamental Skills.

Learning and demonstrating fundamental skills involving drillsand lead up games, if any, therein (Catch as can style).

Take downs: leg tackles, arm drag.

Counters for take downs: Cross face, whizzer series.

Escapes from under: Sitout-turn in triped.

Counters for escapes from under: Basic control, Back drop, counters for stand up.

Pinning combination: Nelson series, (Half Nelson, Half Nelson and bar arm) leg lift series, leg cradle series, Reverse double tar arm, chicken wing and half nelson.

Escapes from pinning: Wing lock series, Double arm lock roll, bridge.

Standing Wrestling: Head under arm series whizzer series.

Referees positions.

4. Rules and their interpretations and duties of officials.

TENNIS

1. Introduction of the game and Historical development with special reference to India.
2. Important Tournaments held at National and International levels and distinguished personalities related to the game.
3. Fundamental Skills

Gips

Eastern Forehand grip

Eastern Backhard grip

Western grip

3.1.5 Chopper grip

Stance and foot work.

Basic Ground storks

Fore hand drive

Backhard drive

Basic Service

Basic Valley

Overhead Valley

Chop

Rules and their interpretations and duties of officials

VOLLEYBALL

1 Introduction of the game and historical development with specialreference to India.

2. Important tournaments help at National and International levelsand distinguished personalities related to the game.

3. Fundamental Skills.

Player's stance- Receiving the ball & passing to the team maes.

The Volley (Over head pass)

The Dig (Under hand pass).

Service-

Under arm Service.

Side Arm Service.

Tennis Service.

Round Arm Service.

Lead up Games-

Three Volleys (These can be combined with service)

Three Digs (Receiving service using dig and setting andplacing using volleying action)

Spike-

Straight Arm Spike.

Round Arm Spike.

Block- 3.5.1Single Block.

4. Advanced Skills-

Pass-

Back Pass.

Back Roll Volley.

Back Roll Dig.

Jump and Pass.

Side Roll Dig.

Service.
Side Arm Floater.
Over head Floater.

Spike-

Spiking cross court.

Spiking down the line.

Block-

Double Block

Triple Black

Dive-

Dive combined with dig (Two handed).

Dive combined with dig (One handed).

5. Rules and their interpretations and duties of officials.

SEMESTER: V

CATEGORY: PCC

SUBJECT CODE: EI 51(A)

SUBJECT NAME: INDUSTRIAL AUTOMATION

COURSE OBJECTIVE: [60Hrs]

The objective of the course is to make the students familiar with different process dynamics in Process industries and different control schemes generally used to get best output.

UNIT I [12 Hrs]

Introduction: Automation overview, Architecture of industrial automation systems-Manufacturing plants and operations- Industrial control Systems- Process, Introduction to automation strategies-Basic elements of automated system- Advanced Automation functions-Levels of automation. Requirement of automation systems, Architecture of Industrial Automation system, Introduction of PLC and supervisory control and data acquisition (SCADA). Industrial bus systems: modbus & profibus

UNIT II[12Hrs]

Automation components: Sensors for temperature, pressure, force, displacement, speed, flow, level, humidity and pH measurement. Actuators, process control valves, power electronics devices DIAC, TRIAC, power MOSFET and IGBT. Introduction of DC and AC servo drives for motion control.

UNIT III[12Hrs]

Computer aided measurement and control systems: Role of computers in measurement and control, Elements of computer aided measurement and control, man-machine interface, computer aided process control hardware, process related interfaces, Communication and networking, Industrial communication systems, Data transfer techniques, Computer aided process control software, Computer based data acquisition system, Internet of things (IoT) for plant automation

UNIT IV[12Hrs]

Programmable logic controllers: Study of basic Programmable controllers, Programmable logic controllers, Role of in automation, advantages of process automation, PLC based control system design, Panel Metering, Analog digital input and output modules, PLC programming, Ladder diagram, Sequential flow chart, PLC Communication and networking, PLC selection, PLC Installation, Advantage of using PLC for Industrial automation, Application of PLC to process control industries. Introduction to SCADA system for distribution automation.

UNIT V[12Hrs]

Overview of Industrial automation using robots: Basic construction and configuration of robot, Pick and place robot, Welding robot.

Industrial control Systems- Process, Discrete manufacturing industries-Continuous and Discrete Control systems-An overview of Computer process control- Fundamentals of automated assembly system.

COURSE OUTCOMES-

The broad knowledge of essential component of present industrial Automation Industry such as Programmable Logic Controller (PLC), Distributed Control System (DCS), Supervisory Control and Data Acquisition (SCDA), industrial drives, human machine interface will enable the students to maintain the above automation.

Reference Books:

[1] Industrial Instrumentation and Control By. S.K. Singh The McGraw Hill Companies

[2] Process Control Instrumentation Technology By. C.D. Johnson, PHI

[3] Industrial control handbook, Parr, Newnem

[4] Programmable logic controller, Dunning, Delmar

TEXT BOOKS

1.Groover, Mikel.P: CAD/CAM-Computer Aided Design and manufacturing-PHI-2000

SEMESTER: V

CATEGORY: PCC

SUBJECT CODE: EI 51(B)

SUBJECT NAME: ANALOG AND DIGITAL COMMUNICATION (ADC)

COURSE OBJECTIVE: [60Hrs]

To introduce the concepts of analog communication systems. . To equip students with various issues related to analogue communication such as modulation, demodulation, transmitters and receivers and noise performance. This course provides the knowledge of analog and digital communication system analysis and design.

UNIT -I [12Hrs]

Review of signals and systems, Frequency domain representation of signals, Principles of Amplitude Modulation Systems- DSB, SSB and VSB modulations. Angle Modulation, Representation of FM and PM signals, Spectral characteristics of angle modulated signals.

UNIT- II [12Hrs]

Review of probability and random process. Gaussian and white noise characteristics, Noise in amplitude modulation systems, Noise in Frequency modulation systems. Pre-emphasis and De-emphasis, Threshold effect in angle modulation.

UNIT-III [12Hrs]

Pulse modulation. Sampling process. Pulse Amplitude and Pulse code modulation (PCM), Differential pulse code modulation. Delta modulation, Noise Considerations in PCM, Time Division multiplexing, Digital Multiplexers.

UNIT-IV[12Hrs]

Elements of Detection Theory, Optimum detection of signals in noise, Coherent communication with waveforms- Probability of Error evaluations. Baseband Pulse Transmission- Inter symbol Interference and Nyquist criterion. Pass band Digital Modulation schemes- Phase Shift Keying, Frequency Shift Keying,Quadrature Amplitude Modulation, Continuous Phase Modulation and Minimum Shift Keying.

UNIT-V[12Hrs]

Digital Modulation tradeoffs. Optimum demodulation of digital signals over band-limited channels- Maximum likelihood sequence detection (Viterbi receiver). Equalization Techniques.

Synchronization and Carrier Recovery for Digital modulation.

COURSE OUTCOMES

This course provides the knowledge of analog and digital communication system analysis and design. After study through lectures and assignments, students will be able to 1. Gain the knowledge of components of analogue communication system.

Text/Reference Books:

1. Haykin S., "Communications Systems", John Wiley and Sons, 2001.

2. Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education,2002.

3. Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill, 2001.

4. Wozencraft J. M. and Jacobs I. M., ``Principles of Communication Engineering",John Wiley,1965.

5. Barry J. R., Lee E. A. and Messerschmitt D. G., ``Digital Communication", Kluwer Academic Publishers, 2004.

6. Proakis J.G., ``Digital Communications", 4th Edition, McGraw Hill, 2000.

SEMESTER: V

CATEGORY: PCC

SUBJECT CODE: EI 51(C)

SUBJECT NAME: BIOMEDICAL INSTRUMENTATION

COURSE OBJECTIVE: [60Hrs]

The basic objective of this course is to provide the fundamental knowledge of Bio-medical Instrumentation, the science associated with the measurement of biological variables such as pressure, temperature etc related to human body, the complexities associated with the measurement of the biological parameters.

UNIT I[12Hrs]

Introduction to the physiology of cardiac, nervous and muscular and respiratory systems. Neuromuscular interface Transducers and electrodes : Different types of transducers selection for Biomedical applications, Electrode theory, different types of electrodes Hydrogen Calomel, Ag~AgCl, pH, P02, PC02 electrodes, selection criteria of electrodes.

UNIT II[12Hrs]

Cardiovascular measurement The heart and other cardio Blood Pressure, Blood flow, Cardiac output and Cardiac rate, Electrocardiography, Phonocardiography, Plethysomography, Magnet
Defibrillator, Computer applications.

UNIT III[12Hrs]

Measurement of Electrical Activities in Muscles and Brain Electromyography, Electroencephalograph and their interpretation. Respiratory System Measurement Respiratory Mechanism, Measurement of gas volume, flow rate carbon dioxide and oxygen concentration in inhaled air, respiratory controller.

UNIT IV[12Hrs]

Instrumentation for Clinical Laboratory measurements, Hemoglobin measurement, oxygen and carbon dioxide concentration in blood, GSR measurement, polar graphic measurements.

UNIT-V[12Hrs]

Medical Imaging: Ultrasound imaging, Radiography, MRI, Electrical Tomography and applications. Biotelemetry. Transmission and Reception aspects of Biological signal via long distances. Aspect of Patient Care Monitoring. Electrical shock hazards and prevention.

COURSE OUTCOMES:

Analyze and evaluate the effect of different diagnostic and therapeutic methods, their risk potential, physical principles, support UNITies and possibilities for different medical procedures. Have a basic understanding of medical terminology, relevant for biomedical instrumentation

REFERENCES:-

1. Biomedical Instrumentation– Pfiffer, Chromvell – PHI
2. Medical Instrumentation– Webster – Willey
3. Medical Instruments & Measurement– Carr – Asia Pearson
4. Handbook & Biomedical Instrumentation–R.S. Khandpur – TMH

SEMESTER: V

CATEGORY: EIOE

SUBJECT CODE: EI 52(A)

SUBJECT NAME: VIRTUAL INSTRUMENTATION (VI)

COURSE OBJECTIVE: [60Hrs]

A virtual instrumentation system is a software that is used by the user to develop a computerized test and measurement system, for controlling an external measurement hardware device from a desktop computer, and for dis- playing test or measurement data on panels in the computer screen.

UNIT – I[12Hrs]

Virtual Instrumentation: An introduction Historical perspective, advantages, block diagram and architecture of a virtual instrument, data-flow techniques, graphical programming in data flow, comparison with conventional programming.

UNIT – II[12Hrs]

Development of Virtual Instrument using GUI, Real-time systems.

UNIT – III[12Hrs]

VI programming techniques:VIs and sub-VIs, loops and charts, arrays, clusters and graphs, case and sequence structures, formula nodes, local and global variables, string and file I/O, Instrument Drivers, Publishing measurement data in the web.

UNIT – IV[12Hrs]

Data acquisition basics: Introduction to data acquisition on PC, Sampling fundamentals, Input/output techniques, and buses.

UNIT -V[12Hrs]

ADC, DAC, Digital I/O, counters and timers, DMA, Software and hardware installation, Calibration, Resolution, Data acquisition interface requirements.

COURSE OUTCOMES:

Gaining skills at using LabVIEW software for instrument control, measurement, data acquisition and data handling. Students are able to publish VIs front panels on the Web, view and control them remotely from LabVIEW or a web browser without any programming.

TEXTBOOKS:

1. LabVIEW Graphical Programming, Gary Johnson, Second edition, McGraw Hill, Newyork, 1997.
2. LabVIEW based Advanced Instrumentation Systems, S. Sumathi and P. Surekha, Spinger.

REFERENCE BOOKS:

1. PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control, Kevin James, Newnes, 2000.
2. WEB RESOURCES: www.ni.com
3. LabVIEW for everyone, Lisa K. wells & Jeffrey Travis Prentice Hall, New Jersey, 1997.

SEMESTER: V

CATEGORY: EIOE

SUBJECT CODE: EI 52(B)

SUBJECT NAME: COMMUNICATION ENGINEERING

COURSE OBJECTIVE: [60Hrs]

Dynamic, efficient and accomplished communication engineer with extensive knowledge of installing, designing, maintaining and troubleshooting communication and electronic devices. Seeking a position as a Senior Communication Engineer where my skills and proficiency will be utilized for smooth connectivity among users.

UNIT-I [12Hrs]

Fourier series, Fourier Transform and its properties, Probability, random variables & moments, their significance, convolution, auto correlation, cross Correlation & power spectral density, Gaussian & Rayleigh probability density Function, mean, variance & standard deviation, central limit theorem, voltage & Power decibel scales. Sign deterministic & random, periodic & non Periodic, analog & discrete, energy & power signals, Representation of sinusoid in different forms & their conversion

UNIT -II [12Hrs]

Need of modulation in a communication system, block schema system. AM modulation system, modulation index, generation & detection of AM wave, side bands & power content in an AM wave, DSB vestigial side Band modulation, AM transmitter system, modulation & demodulation circuits. Relationship between phase & freq. modulation, FM wave & its spectrum, phasor diagram of a narrow band FM signal, wide band FM, methods of generation & detection of FM, broadcasting, FM transmitters.

UNIT -III [12Hrs]

TRF receiver & its limitations, necessity of heterodyning, super heterodyning Receivers, amplifiers, selection of intermediate frequency. RF amplifiers, de receivers, AFC.

UNIT -IV [12Hrs]

Nyquist sampling theorem, TDM, pulse modulations & PCM, quantization error, necessity non linear quantizer, A-law, μ-law, FSK & PSK, QPSK, QAM. Source of noise, noise figure, noise bandwidth, effective noise temperature, performance of AM, FM & digital system in presence of noise.

UNIT -V [12Hrs]

Satellite system block diagram, satellite freq. bands, satellite multiple access Format like TDMA, FDMA, transponders, earth station & satellite eclipses, Link calculation.

COURSE OUTCOMES:

Identify, formulate and solve complex problems to achieve demonstrated conclusions using mathematical principles and engineering sciences. Design system components that meet the requirement of public safety and offer solutions to the societal and environmental concerns. Develop consciousness of professional, ethical and social responsibilities as experts in the field of Electronics and Communication Engineering.

REFERENCES:

1. Taub & shilling, Communication System, TMH
2. Singh & Sapre, Communication System, TMH
3. B.P. Lathi, Modern Digital and ana
4. Simon Haykins, Communication System. John Willy
5. Wayne Tomasi, Electronic Communication system.
6. Schaum outline Series, Analog and digital communication
7. Martin S. Roden, Analog & Digital Communication
8. Frank R. Dungan, Electronic Communication System, Thomson/Vikas
9. John G. Prokis,Masoud Salehi, Gerhard Bauch, Contemporary communication sy
using MATLAB, Cengage learning 2004.

SEMESTER: V

CATEGORY: EIOE

SUBJECT CODE: EI 52(C)

SUBJECT NAME: EDA TOOLS

COURSE OBJECTIVE: [60Hrs]

The objectives of EDA are to: Suggest hypotheses about the causes of observed phenomena. Assess assumptions on which statistical inference will be based. Support the selection of appropriate statistical tools and techniques.

UNIT I [12 Hrs]

Introduction to SPICE

- Potential divider network
- RC integrating and differentiating circuits
- Diode, BJT and MOSFET characteristics
- Diode Circuits (Clipping, Clamping, Rectifiers)

UNIT II [12 Hrs]

- Astable multivibrator
- Truth table verification of basic and universal gates
- Half adder /full adder circuits using gates
- Encoder/Multiplexers

UNIT III [12Hrs]

Introduction to SciLab

- Solving of Mathemaical Equations
- Signal Generations
- Plot the diode/transistor characteristics
- Find the poles and zeros hence plot the transfer functions/polynomials
- Sorting

UNIT IV [12Hrs]

Introduction to HDL

- Basic gates/universal gates
- Combinational Circuits

UNIT V [12Hrs]

- Full adder
- Decoder/Encoder

COURSE OUTCOMES:

Digital design flow regardless of technology is a fully automated process. As described in future chapters, design flow consists of several steps and there is a need for a toolset in each step of the process. Modern FPGA/ASIC projects require a complete set of CAD (Computer Aided Design) design tools

SEMESTER: V

CATEGORY: CORE

SUBJECT CODE: EI 53

SUBJECT NAME: PROCESS INSTRUMENTATION

COURSE OBJECTIVE: [60Hrs]

To impart knowledge about the various techniques used for the measurement of primary industrial parameters like flow, level, temperature, pressure etc To give a detailed knowledge on transducer characteristics and uncertainties in measurement , application of different sensors /transducers their signal conditioning

UNIT -I [12Hrs]

Introduction: Historical Perspective, incentives of process Classification and definition of process variables.

Mathematical modeling: Need and application of mathematical modeling, Lumped and distributed parameters, Analogies, thermal, Electrical, and chemical systems, Modeling of CSTR, Modeling of heat exchanger, Interactive and non elements, Developing continuous time and discrete time models from process data.

UNIT -II[12Hrs]

Control Modes: Definition, Characteristics and comparison of on Differential, PI,PD, PID, Dynamic behavior of feedback controlled processes for different control modes, Control system quality, IAE, ISE, IATE criterion, Tuning o Nichols, Cohen-Coon Methods, controller trouble shooting.

UNIT -III[12Hrs]

Realization of Control Modes: Realization of different control modes like P, I, D in Electric, Pneumatic, Hydraulic controllers.

UNIT -IV[12Hrs]

Actuators: Hydraulic, Pneumatic actuators, Solenoid, EFunctions, Quick opening, Linear and equal percentage valve, Ball valves, Butterfly valves,Globe valves, Pinch valves, valve application and selection, Cavitations and flashing, Dampers and variable speed Drives.

UNIT -V[12Hrs]

Advanced Controls: Introduction to advanced control system like Cascade, Feed forward, Ratio, Selective, Override, Split range and Auctioneering control, Plant wide control. PI Diagrams: Symbols, Terminology, Case studies.

COURSE OUTCOMES

1. The students will be able to handle any kind of process by framing it in block diagram, mathematical model and different process variables.
2. The students will be able to handle different types of controller like electronic, pneumatic and hydraulic.
3. The students will be able to implement different control schemes to various processes.
4. The students will be able to design relay logic for various processes.
5. The students will be able to understand

REFERENCES:-

1. Dale Patrick, Stephen Fardo, "Industrial Process Control System". Shinskey F.G., "Process Control System", III Ed., McGraw Hill.
2. Smith C.A. & A.B. Corripio, "Principle & Practiced Automatic Process Control", J. Willey.
3. Rao M & S.Qiv, "Process Control Engg."
4. George Stephanopoulos " Chemical Process Control" PHI, Delhi
5. C.D. Johnson "Process control instrumentation technology' PHI Harriott Control 1st ed., TMH
6. Patranabis- Principles of Process Control

List of Experiments:-

1. Designing of continuous electronics controllers, (P, I, D, PI, PD, PI D)
2. Study of Electro - Pneumatic Trainer kit and Pneumatic control valves.
3. Controlling of Temperature of water by continuous controllers (P, I, D, PI, PD, PI D).
4. Study of P to I converter and it's Interfacing to electro
5. Study of I to P converter and it's Interfacing to electro
6. Study of PLC and ladder diagram programming.
7. Controlling of flow meter through PLC.
8. Controlling of Bottling plant through PLC.
9. Controlling of Water level through PLC.

10. Implementation of traffic light control through PLC.
11. Controlling of stepper motor through PLC.
12. Study of rotary encoder and its controlling through PLC.

SEMESTER: V

CATEGORY: CORE

SUBJECT CODE: EI 54

SUBJECT NAME: DIGITAL SIGNAL PROCESSING

COURSE OBJECTIVE: [60Hrs]

1. The principle of the syllabus is to give an introduction to basic concepts of system transforms, fundamental principles and applications of signals and filters.

2. This subject provides understanding and working knowledge of design

UNIT – I[12Hrs]

The Discrete Fourier Transform : Discrete Fourier series, Discrete Fourier Transform (DFT),properties of DFT, linear convolution using the DFT, two dimensional DFT

UNIT – II[12Hrs]

Flow Graph and Matrix Representation of Digital Filters: :Signal flow graph representation of digital network, matrix representation, basic network structures for IIR and FIR systems, Telligen's theorem for digital filters and its applications.

UNIT – III[12Hrs]

Digital filter Design Techniques: Design of IIR and FIR digital filters, computer aided design of IIR and FIR filters, comparison of IIR and FIR digital filters.

UNIT -IV[12Hrs]

Computation of the Discrete Fourier Transform: Goertzel algorithm, FT algorithms decimation in time and frequency ,FFFT algorithm for N a composite number, Chirp Z transform(CZT).

UNIT -V[12Hrs]

Discrete Random Signals: Discrete time random process ,averages spectrum representations of infinite energy signals, response of linear system to random signals.

Power Spectrum Estimation :Basic principles of spectrum estimation, estimates of the auto covariance, power spectrum, cross covariance and cross spectrum.

COURSE OUTCOMES:

Upon successful completion of this subject, student will be able to,

1. Determine the frequency response of FIR and IIR filters.
2. Understand the relationship between poles, zeros
3. Determine the spectrum of a signal using the DFT, FFT, and spectrogram.
4. Design, analyze, and implement digital filters in Matlab and C,C++.

R EFERENCES:-

1.A.V.Oppenheim and R. W. Schafer," Digital Signal Processing", Prentice Hall, 1975

2.L.R.Rabiner and B. Gold," Theory and Application of Digital Signal Processing", Prentice Hall 1989

LIST OF EXPERIMENT

1 Generation, analysis and plots of discrete-time signals.

2 Implementation of operations on sequences (addition, multiplication, scaling, shifting, folding

3 Implementation of Linear time-invariant (LTI) systems and testing them for stability and causality

4 Computation and plot of DTFT of sequences, verification of properties of DTFT

5 Computation and plots of z-transforms, verification of properties of z-transforms

6 Computation and plot of DFT of sequences, verification of properties of DFT.

7 Computation and plots of linear/circular convolution of two sequences.

8 Computation of radix-2 FFT- Decimation in time and Decimation in frequency.

9 Implementation of IIR and FIR filter structures (direct, cascade, parallel etc).

10 Implementation of various window design techniques (Rectangular, Bartlett, Hann, Hamming etc).

SEMESTER: V

CATEGORY: EIEL

SUBJECT CODE: EI 55(A)

SUBJECT NAME: CMOS DESIGN

COURSE OBJECTIVEs: [60Hrs]

To learn basic CMOS Circuits. To learn CMOS process technology. To learn techniques of chip design using programmable devices. To learn the concepts of designing VLSI Subsystems.

UNIT I (12Hrs)

Single-Stage Amplifier: Basic Concepts, Common Source Stage, Source Follower, Common-Gate Stage, Cascode Stage. Frequency Response of Amplifiers: General Consideration, Common-Source Stage, Source Followers, Common-Gate Stage, Cascode Stage, Differential Pair.

UNIT II (12Hrs)

Differential Amplifier: Single-Ended and Differential Operation, Basic Differential Pair, Common-Mode Response, Differential Pair with MOS Loads, Gilbert Cell. Feedback Amplifier: General Consideration, Feedback Topologies, Effect of Loading, Effect of Feedback on Noise. Switched-Capacitor Circuits: General Consideration, Sampling Switches, Switched-Capacitor Amplifier, Switched-Capacitor Integrator, Switched-Capacitor Common-Mode Feedback.

UNIT III (12Hrs)

Oscillator: General Consideration, Ring Oscillator, Voltage Controlled Oscillator, Mathematical Model of VCOs. Phase-Locked Loops: Simple PLL, Charge-Pump PLLs, Nonideal Effects in PLLs, Delayed-Locked Loops.

UNIT IV(12Hrs)

Sequential Circuit Design: Introduction, Sequencing Static Circuit, Circuit Design of Latches and Flip-Flops, Static Sequencing Element Methodology. Array Subsystem: Introduction, SRAM, DRAM, Read-Only Memory, Serial Access Memories, Content-Addressable Memory, Programmable Logic Arrays.

UNIT V (12Hrs)

Datapath Subsystems: Introduction, Addition/Subtraction, One/Zero Detector, Comparators, Counters, Boolean Logic Operation, Coding, Shifters, Multiplication, Division, Parallel-Prefix Computations.

COURSE OUTCOMES:

At the end of the course the students will be able to

1. Design different CMOS circuits using various logic families along with their circuit layout.
2. Use tools for VLSI IC design.

References: 1. B. Razavi: Design of Analog CMOS Integrated Circuits, TMH Publication.
2. Weste, Harris and Banerjee: CMOS VLSI Design, Pearson Education
3. J. M. Rabaey, Digital Integrated Circuits, PHI Learning.
4. R. Jacob Baker: CMOS-Circuit Design, Layout and Simulation, Wiley.
5. A. A. Raj and T. Latha: VLSI Design, PHI Learning.

List of Experiments:

Practicals should be performed using any Electronic Design Automation (EDA) - eg. Microwind / Cadence / Sylvaco / Tanner silicon HiPer / Xilinx ISE 9i or any similar software.

1. Design and simulation of: (a) Common source amplifier (b) Source follower amplifier (c) Common gate amplifier (d) Cascode amplifier.
2. Estimation of frequency response of: (a) Common source amplifier (b) Source follower amplifier. (c) Common gate amplifier (d) Cascode amplifier.
3. Design and simulation of differential amplifier.
4. Design and simulation of feedback amplifier.
5. Design and simulation of oscillators: (a) Ring Oscillator (b) L-C Oscillator (c) Voltage controlled Oscillator.

SEMESTER: V

CATEGORY: EIEL

SUBJECT CODE: EI 55(B)

SUBJECT NAME: BIOMEDICAL ELECTRONICS

COURSE OBJECTIVE: [60Hrs]

The objective of this course is to introduce student to basic biomedical engineering technology and introduce different biological signals, their acquisition, measurements and related constraints.

UNIT-1

Fundamental Electronics: Understand the fundamental principles electronics. In particular, gain knowledge in circuit analysis, amplifiers, operational amplifiers, diodes and transistors. Apply knowledge of engineering and science toidentify, formulate, and solve problems in these areas

UNIT-3

Brief introduction to human physiology. Biomedical transducers: displacement,velocity, force, acceleration, flow, temperature, potential, dissolved ions and gases. Bio-electrodes and bio potential amplifiers for ECG, EMG, EEG, etc.

UNIT-3

Measurement of blood temperature, pressure and flow. Impedanc eplethysmography. Ultrasonic, Xray and nuclear imaging. Prostheses and aids: pacemakers, defibrillators, heart-lung machine, Artificial kidney, aids for the handicapped. Safety aspects.

. **UNIT-4**

Data Interpretation: Learn to design, test, and analyze electronic circuits using oscilloscopes and other electronics test equipment. Apply knowledge of engineering and science to interpret data. Develop an understanding of and develop the skills necessary to communicate findings and interpretations in an effective laboratory report.

UNIT-5

Electronic circuits for Biomedical Applications: Apply knowledge of engineering and science tounderstand the principle of biomedical electronic circuits. Understand how to apply, measure circuit performance, and solve problems in the areas of biomedical signals. Work in Multi-disciplinary teams: Learn to work and communicate effectively with peers onmulti-disciplinary teams to attain a common goal.

COURSE OUTCOMES:

1. analyze and evaluate the effect of different diagnostic and therapeutic methods, their risk potential,
   physical principles, opportUNITies and possibilities for different medical procedures.
2. To have a basic understanding of medical terminology, relevant for biomedical instrumentation.

Text/Reference Books:

1. W.F. Ganong, Review of Medical Physiology, 8th Asian Ed, Medical Publishers, 1977.
2. J.G. Websster, ed., Medical Instrumentation, Houghton Mifflin, 1978.
3. A.M. Cook and J.G. Webster, eds., Therapeutic Medical Devices, Prentice-Hall, 1982.

List of Experiments

1. To record and study ECG of a person.
2. To record and study EEG of a person.
3. To record and study EMG of a person.
4. To analyze ECG using a computer.
5. To analyze EEG & EMG using a computer.
6. To measure blood pressure of a person.
7. To measure various respiratory volumes and parameters of a person.

SEMESTER: V

CATEGORY: EIEL

SUBJECT CODE: EI 55(C)

SUBJECT NAME: CONTROL SYSTEMS

COURSE OBJECTIVE **60HRS**

To teach the fundamental concepts of Control systems and mathematical modeling of the system. To teach the concept of time response and frequency response of the system. To teach the basics of stability analysis of the system.

UNIT-I (12Hrs)

Control system

Terminology and classification of control system, examples of control system, mathematical modeling of mechanical and electrical systems, differential equations, block diagram representation and reduction, signal flow graph techniques.

Feedback characteristics of control systems Feedback and non-feedback systems, reduction of parameter variations by use of feedback, control over system dynamics and effects of disturbances by the use of feedback, linearization effect of feedback, regenerative feedback.

UNIT-II(12Hrs)

Time response analysis

Standard test signals, time response of 1st order system, time response of 2nd order system, steady-state errors and error constants, effects of additions of poles and zeros to open loop and closed loop system.

Time domain stability analysis

Concept of stability of linear systems, effects of location of poles on stability, necessary conditions for stability, Routh-Hurwitz stability criteria, relative stability analysis, Root Locus concept, guidelines for sketching Root-Locus.

UNIT-III(12Hrs)

Frequency response analysis

Correlation between time and frequency response, Polar plots, Bode Plots, all-pass and minimum-phase systems, log-magnitude versus Phase-Plots.

Frequency domain stability analysis

Nyquist stability criterion, assessment of relative stability using Nyquist Criterion (phase margin, gain margin and stability), closed-loop frequency response.

UNIT-IV(12Hrs)

Approaches to system design Design problem, types of compensation, design of phase-lag, phase lead and phase lead-lag compensators in time and frequency domain, proportional, derivative, integral and PID compensation.

Digital control systems

System with digital controller, difference equations, the z-transform, pulse transfer function, inverse z transform, the s and z domain relationship.

UNIT-V(12Hrs)

Concept of state, state variables and state model,

State space representation of systems, block diagram for state equation, transfer function decomposition, solution of state equation, transfer matrix, relationship between state equation and transfer function, controllability and observability.

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to

1. Characterize a system and find its study state behavior
2. Investigate stability of a system using different tests
3. Design various controllers
4. Solve liner, non-liner and optimal control problems

REFERENCES:

1) Nagrath and Gopal: Control System Engineering, New Age International Publishers.
2) Kuo: Automatic Control Systems, PHI Learning.
3) Varmah: Control Systems, TMH.

4) Distefano (Schaum series): Control Systems, TMH
5) Manke: Linear Control System, Khanna Publishers.
6) Stefani, Shahian: Design of feedback control systems, Oxford University Press.
7) Ogata: Modern Control Engineering, PHI Learning.

LIST OF EXPERIMENTS

1. Using MATLAB for Control Systems
(a) Introduction to MATLAB.
(b) Polynomials in MATAB
(c)Scripts, Functions & Flow Control in MATLAB**.**

2. Mathematical Modeling of Physical Systems
(a)Mass-Spring System Model.
(b)Speed Cruise Control example:
(c)Mass-Spring System .

3. Performance of First order and second order system.
4. Linear Time-invariant Systems and Representation
(a)Mass-Spring System Mode
(b)Linear Time-Invariant Systems in MATLAB:

SEMESTER: V

CATEGORY: LC

SUBJECT CODE: EI 56

SUBJECT NAME: INDUSTRIAL TRAINING (TWO WEEK)

Duration: 2 weeks after the IV semester in the summer break. Assessment in V semester.

COURSE OBJECTIVE: [60Hrs]

The objectives of industrial training are: To provide students the opportunity to test their interest in a particular career before permanent commitments are made. To develop skills in the application of theory to practical work situations

SCHEME OF EXAMINATION

For the assessment of industrial training undertaken by the students, following components are considered with respective weightage.

A) Term work In Industry Marks allotted

1. Attendance and General Discipline	25
2. Daily diary Maintenance	25
3. Initiative and Participative attitude during training	25
4. Assessment of training by Industrial Supervisor/s	2
Total	**100**

(B) Practical/Oral Examination (Viva

1. Training Report
2. Seminar and cross questioning (defense)

Total

Marks of various components in industry should be awarded to the student, in consultation with the Training and Placement Officer (TPO)/ Faculty
with the supervisor/ authorities of the organization where, students have taken training, to award the marks for term work. During training, students will prepare a first draft of the training report in consultation with the section Incharge. After training they will prepare final draft with the help of the TPO/ faculty of the institute. Then, they will present a seminar on their training and will face viva-voce on training in the institute Bhopal

COURSE OUTCOMES:

1. To expose students to real work environment experience gain knowledge in writing report in technical works/projects.
2. Internship students will have higher levels of academic performance.
3. Internship programs will increase student earning potential upon graduation.
4. To build the strength, teamwork spirit and self-confidence in students life.
5. To enhance the ability to improve students creativity skills and sharing ideas.
6. To build a good communication skill with group of workers and learn to learn proper behavior of corporate life in industrial sector.
7. The student will be able instilled with good moral values such as responsibility , commitment and trustworthy during their training

SEMESTER: V

CATEGORY: MC

SUBJECT CODE: BE 52

SUBJECT NAME: ESSENCE OF INDIAN KNOWLEDGE TRADITION

(60Hrs)

COURSE OBJECTIVE:-

The course on Essence of Indian Knowledge Tradition will focus on Indian philosophical, linguistic and artistic traditions, along with yoga and Indian perspective of modern scientific worldview, reported the Hindustan Times. The curriculum has been reworked to meet the "industry demands"

Basic structure of Indian Knowledge System: Modern Science and Indian Knowledge System– Yoga and Holistic Health care– Case studies–

COURSE OUTCOMES:

Students can extrapolate and interpolate. Students will keep a lab notebook that documents their experience in each lab procedure. Develop skills to impart practical knowledge in real time solution and learn to design new instruments with practical knowledge.

References

1. V. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya Bhavan, Mumbai. 5th Edition, 2014

2.Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan

3. Swami Jitatmanand, Holistic Science and Vedant, Bharatiya Vidya Bhavan Fritzof Capra, Tao of Physics Fritzof Capra, The Wave of life VN Jha (Eng. Trans.),

4.Tarkasangraha of Annam Bhatta, International Chinmay Foundation, Velliarnad, Arnakulam Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata GN Jha (Eng. Trans.),

5.Ed. RN Jha, Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakashan, Delhi 2016

6. RN Jha, Science of Consciousness Psychotherapyand Yoga Practices, Vidyanidhi Prakashan, Delhi 2016

7.P B Sharma (English translation), Shodashang Hridayan

SEMESTER: V

CATEGORY: PDFS

SUBJECT CODE: BE 53

SUBJECT NAME: PROFESSIONAL DEVELOPMENT FINISHING SCHOOL

LEVEL-III

TOTAL - 36 HOURS

COURSE OBJECTIVE

The students are to be groomed with respect to personality development. Further improvement in English, Aptitude and reasoning ability is desirable.

UNIT-I(12 HOURS)

Conversational English:

Grammar mainly Active and Passive Voice, 250 sentences of daily use irrespective of any specific tenses**.**

UNIT-II(12 HOURS)

Conversational English:

100 sentences of daily use related to professional and formal environment Report Writing with necessary punctuations and with editor′s eye, Thematic Apperception, Expression of Feelings 2-minutes Talk by the students, Smart Etiquettes and Tidiness **.**

UNIT-III(12 HOURS)

Aptitude/Reasoning

Quantitative Aptitude and Logical Reasoning – Level III Problem solving on, Average, Time work, percentage, Probability, Permutation and Combination. Question- Statements, Theme Detection, Statement Assumptions, Statement Argument**.**

Course Outcome

Further improvement in reading, writing and vocal English is achieved. Aptitude and reasoning aspect shows improvement.

OFFERING NCC A GENERAL GENERIC ELECTIVE CREDIT COURSE IN UNIVERSITIES UNDER CHOICE BASED CREDIT SYSTEM TO ALIGN WITH NEW EDUCATION POLICY 2020

CONTENTS

SECTIONI:NCC CREDIT COURSE DESIGN DOCOMENT

UNDER CHOICE BASED CREDIT SYSTEM AS GENERAL ELECTIVE FOR SENIOR DIVISION / SENIOR WING

6. **Preamble**. The National Cadet Corps (NCC) is governed by NCC Act 1948 and attendant NCC Rules. It functions under the Ministry of Defence and is headed by DGNCC. It is organised into 17 State Directorates each headed by an Additional/Deputy Director General. The aims of NCC are:-
   (a) To develop character, camaraderie, discipline, secular outlook, the spirit of adventure, sportsman spirit and ideals of selfless service amongst cadets by working in teams, honing qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.
   (b) To create a pool of organized, trained and motivated youth with leadership qualities in all walks of life, who will serve the Nation regard less of which career they choose.
   (c) To provide a conducive environment to motivate young Indians to choose the Armed Forces as a career.
7. **Purpose.** Currently NCC training is imparted as extra-curricular activity to volunteer students from recognized schools and colleges who enroll as cadets. NCC as a Credit Course is designed with an intent to transform NCC training into a curricular activity from an extra-curricular thereby providing academic credits to students undergoing NCC training along with other attended advantages to the cadets in the college/ university.

8. **Introduction to NCC Credit Course Design.** Institutional Training is the mainstay of NCC training and it is conducted at colleges and universities by Associate NCC Officers and Armed Forces personnel. The application of knowledge gained through institutional training is further honed or developed to a higher degree in NCC Camps. The Institutional Training syllabus comprises Common Subjects and Specialised Subjects (military component). NCC Credit Course is designed to offer Institutional Training of

330

300 periods

Senior Wing /Division is over six semesters (three years), comprising

(excluding Camp), of which 120 periods are meant for theory with 108 credits and 180 periods for practical with 6 credits. Each period is counted as hour. The ratio between theory and practical in terms of number of hours of training is 5:6, but in terms of credits is 5:3, since as per CBCS two hours of practical is counted towards one period of training as against one hour for theory. In addition two separate courses have been designed for two Camps normally referred to as Annual Training Camps (ATC).

Training schedules planned for cadets ensure that the optimum benefits of the NCC organization reach maximum number of cadets. The main emphasis is on practical training which in consonance with theory is made to facilitate active participation of learner, better assimilation of knowledge, and proper development of various skills, strengthening of mind and body which is the bedrock of NCC training.

NCC GENERAL ELECTIVE CREDIT COURSE DESIGN SUMMARY					
Semester	**Credits Allocated**			**Total**	**Remarks**
	Theory	**Practical**	**Camp**		
Semester - I	**01**	**01**	**-**	**02**	
Semester - II	**01**	**01**	**-**	**02**	
Semester – III	**01**	**01**	**05**	**07**	**Credits of 1st Camp merged with 3rd Sem**
Semester – IV	**02**	**01**	**-**	**03**	
Semester – V	**01**	**01**	**05**	**07**	**Credits of 2nd Camp merged with 5th Sem**
Semester - VI	**02**	**01**	**-**	**03**	
Total	**08**	**06**	**10**	**24**	**Twenty-Four Credits**

INSTITUTIONAL TRG SYLLABUS

COMMON SUBJECTS				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**NCC General**	**06**	**-**	**06**
2	**National Integration**	**04**		**04**
3	**Drill**	**-**	**45**	**45**
4	**Weapon Training**	**-**	**25**	**25**
5	**Personality Development**	**25**		**25**
6	**Leadership**	**12**	**-**	**12**
7	**Disaster Management**	**13**		**13**
8	**Social Service & Community Development**	**08**	**39**	**47**
9	**Health & Hygiene**	**-**	**10**	**10**
10	**Adventure**	**01**		**01**
11	**Environmental awareness & conservation**	**03**		**03**
12	**Obstacle Training**	**-**	**09**	**09**
13	**General Awareness**	**04**		**04**
14	**Border & Coastal Areas**	**06**		**06**
TOTAL HOURS COMMON SUBJECTS(a)		**82**	**128**	**210**

SPECIALSED SUBJECTS (ARMY)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practical**	
1	**Armed Forces**	**09**	**-**	**09**
2	**Map Reading**	**-**	**24**	**24**
3	**Communications**	**03**	**03**	**06**
4	**Infantry Weapons**	**03**	**03**	**06**
5	**Field Craft & Battle Craft**		**22**	**22**

6	**Military History**	**23**	**-**	**23**
Total Hours		**38**	**52**	**90**

SPECIALSED SUBJECTS (NAVY)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**Naval Orientation**	**12**	**-**	**12**
2	**Naval Communication**	**02**	**18**	**20**
3	**Navigation**	**02**	**03**	**05**
4	**Seamanship**	**15**	**18**	**33**
5	**Fire Fighting and Damage Control**	**04**	**03**	**07**
6	**Ship and Boat Modelling**	**03**	**10**	**13**
Total hours		**38**	**52**	**90**

SPECIALISED SUBJECTS (AIR FORCE)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**General Service Knowledge**	**08**	**-**	**08**
2	**Air Campaign**	**06**	**02**	**08**
3	**Principles of flight**	**06**	**06**	**12**
4	**Airmanship**	**01**	**07**	**08**
5	**Navigation**	**05**	**-**	**05**
6	**Aeroengines**	**06**	**-**	**06**
7	**Basic flight Instruments**	**03**	**03**	**06**
8	**Aero modelling**	**03**	**34**	**37**
Total Hours		**38**	**52**	**90**

INSTITUTIONAL TRAINING: TOTAL HOURS & CREDITS

INSTITUTIONAL TRAINING: TOTAL HOURS & CREDITS			
ITEM	Periods (1 hour duration each)		Total
	Lectures/Tutorials	Practicals	
TOTAL HOURS COMMON SUBJECTS	82	128	210
TOTAL HOURS SPECIALISED SUBJECTS(ARMY/NAVY/AIR FORCE)	38	52	90
TOTAL HOURS INSTITUTIONAL TRAINING	120	180	300
TOTAL CREDITS INSTITUTIONAL TRAINING	08 CREDITS (15 HOUR THEORY = 1 CREDIT POINT)	6 CREDITS (30 HOURS PRACTICAL TRAINING = 1 CREDIT POINT)	

NCC CAMP TRAINING SYLLABUS

COMMON SUBJECTS				
S No.	**Subjects**	**Periods**		**Total**
		L/T	**P**	
1.	Physical Training	-	18	18
2.	Drill	-	32	32
3.	Weapon Training	08	28	36
4.	National Integration and Awareness	08	-	08
5.	Personality Development	08	12	20
6.	Leadership	08	-	08
7.	Disaster Management	08	-	08
8. .	Social Service and Community Development	-	08	08
9.	Health & Hygiene	08	-	08
10.	Obstacle Training	-	04	04
11.	Military History	04	-	04
12.	Communication	04	-	04
13.	Games	-	18	18
14.	Culture	-	18	18
	TOTAL	**56**	**138**	**194**
SPECIALISED SUBJECTS				
1.	Map Reading	-	24	24
2.	Infantry Weapons	04	02	06
3.	Field Craft & Battle Craft	-	16	16
	TOTAL	**04**	**42**	**46**
	GRAND TOTAL	**60 (4 credit)**	**180 (6 credit)**	**240 (10 credit)**

NCC CAMP TRAINING SYLLABUS (FOR THEORY)

Ser No	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Weapon Training	-	-	04	-	04	-	08
2.	National Integration & Awareness	-	-	04	-	04	-	08
3.	Personality Development	-	-	04	-	04	-	08
4.	Leadership	-	-	04	-	04	-	08
5.	Disaster Management	-	-	04	-	04	-	08
6.	Health & Hygiene	-	-	04	-	04	-	08
7.	Military History			02		02		04
8.	Communication			02		02		04
9.	Infantry Weapons	-	-	02	-	02	-	04
	TOTAL	-	-	30	-	30	-	60
	TOTAL Credit	-	-	2	-	2	-	4

NCC CAMP TRAINING SYLLABUS (FOR PRACTICAL)

Ser No	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Physical Training	-	-	09	-	09	-	18
2.	Drill	-	-	16	-	16	-	32
3.	Weapon Training	-	-	14	-	14	-	28
4.	Personality Development	-	-	06	-	06	-	12
5.	Social Service and Community Development	-	-	04	-	04	-	08
6.	Obstacle Training	-	-	02	-	02	-	04
7.	Games			09		09		18
8.	Culture			09		09		18
9.	Map Reading	-	-	12	-	12	-	224
10.	Infantry Weapons	-	-	01	-	01	-	02
11.	Field Craft & Battle Craft	-	-	08	-	08	-	16
	TOTAL			**90**		**90**		**180**
	TOTAL CREDIT			**03**		**03**		**06**

SEMESTER WISE COURSE DESIGN ARMY CADETS

INSTITUTIONAL TRAINING: SEMESTER WISE DISTRIBUTION OF NCC SYLLABUS FOR THEORY(ARMY CADETS)

S. NO.	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	NCC General	06	-	-	-	-	-	06
2.	National Integration	04	-	-	-	-	-	04
3.	Personality Development	02	05	05	04	06	04	25
4.	Leadership	-	05	04	03	-	-	12
5.	Disaster Management	-	-	03	10	-	-	13
6.	Social Service & Community Development	03	05	-	-	-	-	08
7.	Adventure	-	-	01	-	-		01
8.	Environmental Awareness & Conservation	-	-	-	03	-		03
9.	General Awareness	-	-	-	04	-		04
10.	Border & Coastal Areas	-	-	02	-	02	02	06
11.	Armed Forces	-	-	-	06	-	03	09
12.	Infantry Weapons	-	-	-	-	3	-	3
13.	Communication	-	-	-	-	-	03	03
14.	Military Hospital	-	-	-	-	04	19	23
	TOTAL	15	15	15	30	15	30	120
	TOTAL Credit	1	1	1	2	1	2	08

INSTITUTIONAL TRAINING: SEMESTER WISE DISTRIBUTION OF NCC SYLLABUS FOR PRACTICAL (ARMY CADETS)

S. NO.	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Drill	12	12	08	07	03	03	45
2.	Field Craft & Battle Craft	03	04	04	04	04	03	22
3.	Map Reading	03	05	04	04	04	04	24
4.	Weapons Training	05	04	04	04	04	04	25
5.	Communication	-	-	-	-	-	03	03
6.	Infantry Weapons	-	-	-	-	-	03	03
7.	Social Service & Community Development	07	05	05	06	06	10	39
8.	Health & Hygiene	-	-	-	05	05	-	10
9.	Operation Training	-	-	05	-	04		09
	TOTAL	30	30	30	30	30	30	180
	TOTAL Credit	01	01	01	01	01	01	06

INSTITUTIONAL TRAINING: SEMESTER WISE THEORY DETAILED SYLLABUS (ARMY CADETS)

SEMESTER I					
S.No	Subject	Periods	Chapter	Lesson	Hours
1	NCC General	6	NCC-I	Aims, Objectives and Org of NCC	1
			NCC-II	Incentives	2
			NCC-III	Duties of NCC Cadets	1
			NCC-IV	NCC Camps: Types and Conduct	2
2	National Integration and Awareness	4	NI-I	National Integration: Importance and Necessity	1
			NI-II	Factors affecting National Integration	1
			NI-III	Unity in Diversity	1
			NI-IV	Threats to National Security	1
3	Personality Development	2	PD - I	Factors Self-Awareness Empathy Critical and Creative Thinking Decision Making and Problem Solving	2
4	Social Service and Community Development	3	SSCD - I	Basics of Social Service Rural Development Programmes NGO's Contribution of Youth	3
				TOTAL HOURS	**15**
				TOTAL CREDITS	**1**

SEMESTER II					
S.No	Subject	Periods	Chapter	Lesson	Hours
5	Personality Development	5	PD-II	Communication Skills	3
			PD-III	Group Discussion -Coping with Stress and Emotions	2
6	Leadership	5	L-I	Leadership Capsule Traits Indicators Motivation Moral Values Honour Code	3
			L-II	Case Studies Shivaji, Jhansi Ki Rani,	2
7	Social Service and Community Development	5	SS-IV	Protection of Children & Women Safety	1
			SS-V	Road/Rail Travel Safety	1
			SS-VI	New Initiatives	2
			SS-VII	Cyber and Mobile Security Awareness	1
				TOTAL HOURS	**15**
				TOTAL CREDITS	**1**

SEMESTER III					
S.No	Subject	hours	Chapter	Lesson	HOURS
8	Personality Development	5	PD-III	Group Discussions - Change your Mindset	2
			PD-V	Public Speaking	3
9	Leadership	4	L-II	Case Studies – APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy	4
10	Disaster Management	3	DM-I	Disaster Management Capsule Organisation Types of Disasters Essential Services Assistance Civil Defence Organisation	3
11	Adventure	1	AD-I	Adventure activities	1
12	Border & Coastal Areas	2	BCA-I	History, Geography & Topography of Border/ Coastal Areas	2
TOTAL HOURS					**15**
TOTAL CREDITS					**1**

SEMESTER IV					
S.No	Subject	hours	Chapter	Lesson	HOURS
13	Personality Development	4	PD-III	Group Discussions - Time Management, Social Skills	4
14	Leadership	3	L-II	Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war	3
15	Disaster Management	9	DM-II	Initiative Trg, Organising Skills, Dos and Don'ts Natural Disasters Man Made Disasters	9
		1	DM-III	Fire Services and Fire Fighting	1
16	Environmental Awareness	3	EA-I	Environmental Awareness and Conservation	3
17	General Awareness	4	GA-I	General Awareness	4
18	Armed Forces	6	AF-1	Army, Navy, Air Force and Central Armed Police Forces	6
TOTAL HOURS					30
TOTAL CREDITS					2

SEMESTER V					
S.No	Subject	hours	Chapter	Lesson	HOURS
19	Personality Development	6	PD-III	Group Discussions - Team Work	2
			PD-V	Public Speaking	4
20	Border & Coastal Areas	2	BCA-II	Security Setup and Border/Coastal management in the area	2
21	Introduction to Infantry Battalion and its Equipments	3	INF-1	Organisation of Infantry Battalion & its weapons	3
22	Military History	4	MH-3	Study of Battles of Indo-Pak Wars 1965 & 1971	4
TOTAL HOURS					15
TOTAL CREDITS					1

SEMESTER VI					
S.No	Subject	hours	Chapter	Lesson	HOURS
25	Personality Development	3	PD-IV	Career Counselling, SSB Procedure and Interview Skills	3
27	Border & Coastal Areas	2	BCA-III	Security Challenges & Role of cadets in Border management	2
28	Armed Forces	3	AF-2	Modes of Entry into Army, Police and CAPF	3
29	Military History	19	MH-1	Biographies of Renowned Generals	6
			MH-2	War Heroes : Param Veer Chakra Awardees	3
			MH-3	Study of Battles of Kargil	2
			MH-4	War Movies	8
30	Communication	3	C-1	Introduction to Communication & Latest Trends	3
TOTAL HOURS					30
TOTAL CREDITS					2

SIX SEMESTER NCC COURSE SYLLABUS

Training Objectives: Institutional Training

97. Institutional training includes basic military training of the cadets as part of the curriculum with its long-standing effort to mould young volunteers into disciplined and responsible citizens of India. NCC course is aimed to achieve following learning objectives:-

(a) Develop character, camaraderie, discipline, secular outlook, the spirit of adventure, sportsman spirit and ideals of selfless service amongst cadets by working in teams, honing qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.

(b) To create interest in cadets by including and laying emphasis on those aspects of Institutional Training which attract young cadets into the NCC and provides them an element of thrill and excitement.

(c) To inculcate defence Services work ethos that is characterized by hard work, sincerity of purpose, honesty, ideal of selfless service, dignity of labour, secular outlook, comradeship, spirit of adventure and sportsmanship.

(d) To create a pool of organized, trained and motivated youth with leadership qualities in all walks of life, who will serve the Nation regardless of which career they choose.

(e) To provide conducive environment to motivate young Indians to choose the Armed Forces as a career.

SEMESTER I COURSE MODULE : NATIONAL CADET CORPS I

National Cadet Corps : Course Details			
Course Title: National Cadet Corps I			
Course Code	**BNCC01GE03**	**Credits**	**1(Thr)+ 1(Pr) = 03**
L /T + P	**15+30**	**Course Duration**	**1 Semester**
Semester	**I (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e, 25% internal assessment and 75% end term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

98. **Course Objectives:** Cadets will be able to: -

(a) Know about the history of NCC, its organization, and incentives of NCC for their career prospects.

(b) Acquire knowledge of duties and conduct of ncc cadets.

(c) Understand about different NCC camps and their conducts.

(d) Understand the concept of national integration and its importance.

(e) Understand the concept of self-awareness and emotional intelligence.

(f) Understand the concept of critical & creative thinking.

(g) Understand the process of decision making & problem solving.

(h) Understand the concept of team and its functioning.

(i) Understand the concept and importance of Social service.

99. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Imbibe the conduct of NCC cadets.

(b) Respect the diversity of different Indian culture.

(c) Practice togetherness and empathy in all walks of their life.

(d) Do their own self analysis and will workout to overcome their weakness for better performance in all aspects of life.

(e) Understand creative thinking & its components.

(f) Think divergently and will try to break functional fixedness.

(g) Make a team and will work together for achieving the common goals.

(h) Do the social services on different occasions.

100. Course Content Part (I) Theory

(a) **Unit 1- NCC General (N) (Contact Hrs. 06)**. Introduction of NCC, History, Aims, Objective of NCC & NCC as Organization, Incentives of NCC, Duties of NCC Cadet. NCC Camps: Types & Conduct.

(b) **Unit 2-National Integration & Awareness (NI) (Contact Hrs. 04)** . National Integration: Importance & Necessity, Factors Affecting National Integration, Unity in Diversity & Role of NCC in Nation Building, Threats to National Security.

(c) **Unit 3- Personality Development (Contact Hrs. 3)**. Intra & Interpersonal skills - Self-Awareness- &Analysis, Empathy, Critical & creative thinking, Decision making and problem solving.

(d) **Unit 4- Social Service and Community Development(Contact Hrs. 02)**. Basics of social service and its need, Types of social service activities, Objectives of rural development programs and its importance, NGO's and their contribution in social welfare, contribution of youth and NCC in Social welfare.

Course Content Part (II) Practical

101. **Course Objectives:** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of foot drill.

(c) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(d) Develop awareness about different types of terrain and how it is used in battle craft.

(e) Develop the concept of various markings on the map and how they are co-related to the ground features.

(f) Understand the various social issues and their impact on social life.

(g) Develop the sense of self-less social service for better social & community life.

102. **Expected Learning Outcomes:** After completing this course, the cadets will be able to: -

(a) Perform foot drill and follow the different word of command.

(b) Fire a weapon effectively with fair degree of marksmanship.

(c) Undertake point to point navigation and take part in route marches by day and night.

(d) Perform the social services on various occasions for better community & social life.

103. Course Content Part (II) Practical

(a) **Unit 1. Drill (Contact Hrs. 12)**. Foot Drill- Drill ki Aam Hidayaten, Word ki Command, Savdhan, Vishram, Aram Se, Murdna, Kadvar Sizing, Teen Line Banana, Khuli Line, Nikat Line, Khade Khade Salute Karna Parade Par, Visarjan, Line Tod, Tej Chal, Tham aur Dhire Chal, Tham.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 05)**. Introduction & Characteristics of .22 rifle, Handling of .22 rifle.

(c) **Unit 3. Map Reading (MR) (Contact Hrs. 03)**. Definition of Map, Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Magnetic Variation and Grid Convergence.

(d) **Unit 4. Field Craft & Battle Craft (FC & BC) (Contact Hrs. 03)**. Introduction of Field Craft & Battle craft, Judging Distance, Method of Judging Distance.

(e) **Unit 5. Social Service and Community Development (SSCD)(Contact Hrs.07)**.Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc.

SEMESTER II COURSE MODULE : NATIONAL CADET CORPS II

Course Title: National Cadet Corps II			
Course Code	**BNCC02GE03**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15+30**	**Course Duration**	**1 Semester**
Semester	**II (Even)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

104. **Course Objectives:** Cadets will be able to: -

(a) Understand the thinking & reasoning process.

(b) Understand the process to cope with Stress & emotions.

(c) Understand the importance of improving communication skills.

(d) Identify the leadership traits.

(e) Admire the qualities of great leaders.

(f) Know about different legal provisions for children & women safety and protection.

(g) Understand the various rules & measures to be taken to ensure Road/Rail safety.

(h) Understand & spread awareness about latest Government initiatives for welfare of citizens and contribute towards Nation building.

(i) Understand concepts of cyber and mobile security.

105. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Define thinking, reasoning, critical thinking and creative thinking.

(b) To think critically about different life related issues.

(c) Think divergently and will try to break functional fixedness.

(d) Creatively in their real-life problems.

(e) Understand the organizations related to disaster management and theirfunctioning.

(f) Appreciate the role of NCC cadets in disaster management.

106. Course Content Part (I) Theory

(a) Unit 1. Personality Development (Contact Hrs.5)

(i) Thinking- Meaning and Concept of thinking, Reasoning, Process of thinking.

(ii) Critical Thinking- Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking.

(iii) Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.

(b) Unit 2. Leadership Development (Contact Hrs.5)

(i) Leadership capsule.

(ii) Important Leadership traits, Indicators of leadership and evaluation.

(iii) Motivation- Meaning & concept, Types of motivation. Factors affecting motivation.

(iv) Ethics and Honor codes.

(c) Unit 3. Social Service and Community Development (Contact Hrs. 5)

(i) Protection of Children & Women Safety.

(ii) Road/Rail Safety.

(iii) New Government Initiatives.

(iv) Cyber and mobile Security Awareness.

Course Content Part (II) Practical

107. **Course Objectives**. Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of foot drill.

(c) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(d) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

108. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Perform foot drill gracefully.

(b) Give and follow the different word of command.

(c) Fire a weapon effectively with fair degree of marksmanship.

(d) Use of bearing and service protractor and locate the places and objects on the ground.

(e) Do the social service and feel connected with social problems.

109. Course Content Part (II) Practical

(a) Unit 1. Drill (Contact Hrs. 12)

(i) Foot Drill Dahine, Baen, Aageaur Piche Kadam Lena.

(ii) Tej Chal se Murdna, Tej Chal se Salute Karna, Tej Kadam Taal aur Tham, Tej Kadam Taal se Kadam Badalna.

(iii) Teeno Teen se Ek File aur ek file se Teeno Teen Banana

(b) Unit 2.Weapon Training(Contact Hrs. 04)

(i) Range procedure & Theory of group.

(ii) Short Range firing.

(c) Unit 3. Map Reading(Contact Hrs. 05)

(i) Protractor Bearing and its conversion methods.

(ii) Service protractor and its uses.

(iii) Prismatic compass and its uses and GPS.

(iv) Navigation by compass and GPS.

(d) Unit 4. Field Craft & Battle Craft (Contact Hrs. 04)

(i) Indications of landmarks and Targets.

(ii) Intro, Definitions, Types of Ground, Indication of Landmarks, Methods of iden of targets, difficult targets.

(e) **Unit 5.Social Service and Community Development(Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and state level.

SEMESTER III COURSE MODULE : NATIONAL CADET CORPS III

COURSE TITLE: NATIONAL CADET CORPS III			
Course Code	**BNCC03GE02**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15 +30**	**Course Duration**	**1 Semester**
Semester	**III (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

110. **Course Objectives**. Cadets will be able to: -

(a) Understand the life history and leadership qualities of great leaders, sportspersons & entrepreneurs.

(b) Understand the various aspects of types of mindset.

(c) Understand public speaking methods &qualities.

(d) Understand the organizations related to disaster management and their functioning.

(e) Understand the role of NCC cadets in disaster management.

(f) Understand the various types of adventure activities.

(g) Understand the History, Geography & Topography of Border/ Coastal Areas.

111. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Admire and get inspired from the accomplishments of leaders from various walks of life.

(b) Develop public speaking skills.

(c) Understand the importance of positive mindset and optimistic attitude in life.

(d) Appreciate the need & requirement for disaster management and his role in disaster management activities.

(e) Know the history & geographical peculiarity of our borders & coastal regions.

112. Course Content Part (I) Theory

(a) Unit 1. Personality Development (Contact Hrs.5)

(i) Group Discussions - Change your Mindset

(ii) Public Speaking.

(b) **Unit 2. Leadership Development (Contact Hrs.4)**.Case Studies– APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy.

(c) Unit 3. Disaster management(Contact Hrs. 3)

(i) Disaster Management Capsule.

(ii) Organisation.

(iii) Types of Disasters.

(iv) Essential Services.

(v) Assistance.

(vi) Civil Defence Organisation.

(d) **Adventure (Contact Hrs. 1)**.Adventure activities.

(e) **Border & Coastal Areas(Contact Hrs. 2)**. History, Geography & Topography of Border/ Coastal Areas.

Course Content Part (II) Practical

113. **Course Objectives**. Cadets will be able to : -

(a) Understand that drill as the foundation for discipline and to command a group for common goal

(b) Appreciate grace and dignity in the performance of arm drill

(c) Understand the concept and importance of social service.

(d) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(e) Actively participate in social service and community development activities.

114. **Expected Learning Outcomes**.After completing this course, the cadets will be able to: -

(a) Perform arm drill gracefully.

(b) Give and follow the different word of command.

(c) Fire a weapon effectively with fair degree of marksmanship.

(d) Different positioning for fire and aiming.

(e) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(f) Observe surroundings in better way.

(g) Develop the qualities of patience and confidence and become better individuals.

(h) Will develop physical as well as mental fitness.

115. Course Content Part (II) Practical

(a) Unit 1. Drill(Contact Hrs. 08)

(i) Arm Drill.

(ii) Rifle ke saath Savdhan, Vishram aur Aram se.

(iii) Rifle ke saath Parade Par aur Saj, Rifle ke saath Visarjan, Line Tod.

(iv) Bhumi Shastra aur Uthao Shastra, Bagal Shastra aur Baju Shastra.

(b) **Unit 2. Weapon Training(Contact Hrs. 04)**. Short Range firing.

(c) **Unit 3. Map Reading (Contact Hrs. 04)**.

(i) Setting of Map.

(ii) Findings North and Own Position.

(d) Unit 4. Field Craft & Battle Craft (Contact Hrs. 04)

(i) Observation.

(ii) Camouflage.

(iii) Concealment.

(e) **Unit 5. Social Service and Community Development (Contact Hrs. 05)**. Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) Unit 6. Obstacle Training(Contact Hrs. 05)

(i) Obstacle training - Introduction, Safety-measures, Benefits.

(ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall.

SEMESTER IV COURSE MODULE : NATIONAL CADET CORPS IV

Course Title: National Cadet Corps IV			
Course Code	BNCC04GE03	Credits	2(Thr)+ 1(Pr)=03
L /T + P	30+30	Course Duration	1 Semester
Semester	IV (Even)	Contact Hours	30(Thr)+30(Pr)=60Hours
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

116. **Course Objectives**. Cadets will be able to: -

(a) Develop a sense of time management and social skills.

(b) Understand the life history & leadership qualities of personalities who have contributed in Nation Building and Literature.

(c) Understand the role of NCC cadets as 2nd line Defence in 1965 War.

(d) Develop awareness about various types of Natural and manmade disasters.

(e) Know about life saving tips during disasters.

(f) acquainted about Fire Services.

(g) Understand importance of Environmental Awareness & conservation.

(k) Understand importance of General Awareness.

(l) Know about Armed Forces.

(d) **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(i) Effectively Manage time.

(ii) Develop the qualities of social skills.

(iii) Imbibe leadership qualities.

(iv) Do group discussions effectively.

(v) Be motivated to serve the nation by joining Armed forces.

(vi) Contribute in environmental awareness and conservation activities.

(vii) Keep abreast of current affairs & general awareness. (viii)Effectively contribute in managing disaster relief tasks.

117. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.4)**. Group Discussions – Social Skills & Time management.

(b) **Unit 2. Leadership Development (Contact Hrs.3)**.Case Studies – Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war.

(c) Unit 3. Disaster management(Contact Hrs. 10)

(i) Initiative Trg, Organising Skills.

(ii) Dos and Don'ts.

(iii) Natural Disasters.

(iv) Man Made Disasters.

(v) Fire Services and Fire Fighting.

(d) **Environmental Awareness (Contact Hrs. 3)**. Adventure Environmental Awareness and Conservation.

(e) **General Awareness (Contact Hrs. 4)**. General Awareness.

(f) **Armed Forces(Contact Hrs. 6)**.Army, Navy, Air Force and Central Armed Police Forces.

Course Content Part (II) Practical

118. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Understand various signals to convey messages in the army.

(c) Get acquainted various section formations.

(d) Understand the basics of personal and public hygiene.

(e) Get acquainted with the procedure to treat the wounds and fractures during emergencies.

119. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform weapon drill gracefully.

(b) Give and follow the different word of command.

(c) Appreciate grace and dignity in the performance of foot drill.

(d) Apply signals in there day to day functioning.

(e) Provide first aid during the emergencies.

(f) Navigate to the given location on ground using compass and GPS.

(g) Practice healthy practices for the personal sanitation and hygiene.

120. Course Content Part (II) Practical

(a) Unit 1. Drill (Contact Hrs. 08)

(i) Arm Drill.

(ii) Salami Shastra.

(iii) Squad Drill with Arms.

(b) **Unit 2. Weapon Training (Contact Hrs. 04)**. Short Range firing

(c) Unit 3. Map Reading(Contact Hrs. 04)

(i) Map to Ground.

(ii) Ground to Map.

(d) Unit 4. Field Craft & Battle Craft(Contact Hrs. 04)

(i) Fire and Move Capsule.

(ii) Field signal- with hand, with Weapons, Signal with Whistle.

(iii) Field signals as means of giving orders.

(iv) Field signals by day, Field signals by night.

(v) Section Formation.

(e) **Unit 5. Social Service and Community Development(Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) Unit 6. Health &Hygiene(Contact Hrs. 05)

(i) Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene).

(ii) First Aid in common medical emergencies.

(iii) Treatment & Care of Wounds.

SEMESTER V COURSE MODULE : NATIONAL CADET CORPS V

Course Title: National Cadet Corps V			
Course Code	**BNCC05GE02**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15 +30**	**Course Duration**	**1 Semester**
Semester	**V (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

121. **Course Objectives**. Cadets will be able to: -

(a) Understand the concept of Team and its functioning.

(b) Hone Public speaking skills.

(c) Understand the security set up amd management of Border/Coastal areas.

(d) Acquire knowledge about an Infantry Battalion organisation and its weapons.

(e) Acquire knowledge about Indo-Pak Wars fought in 1965 & 1971.

122. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Participate in team building exercise and value team work.

(b) Improve communication skills by public speaking activities.

(c) Understand the security mechanism and management of Border/Coastal areas.

(d) Get motivated to join armed forces.

123. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.6)**.

(i) Group Discussions –Team work.

(ii) Public speaking.

(b) **Unit 2. Border & Coastal Areas(Contact Hrs.2)**. Security Setup and Border/Coastal management in the area.

(c) **Unit 3. Introduction to Infantry Battalion and its Equipment(Contact Hrs. 3)**.

Organisation of Infantry Battalion & its weapons

(d) **Military History(Contact Hrs. 4)**. Study of Battles of Indo-Pak Wars 1965 & 1971.

Course Content Part (II) Practical

124. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of ceremonial drill.

(c) Use the compass and GPS to locate places on the ground and map.

125. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform ceremonial drill and follow the different word of command.

(b) Do the social service on various occasions and get connected with the community.

(c) Do all the asana and gain the physical& mental fitness.

126. Course Content Part (II) practical

(a) Unit 1. Drill(Contact Hrs. 03)

(i) Ceremonial Drill.

(ii) Guard Mounting.

(b) Unit 2. Field Craft & Battle Craft(Contact Hrs. 04)

(i) Fire control orders.

(ii) Types of fire control orders.

(iii) Fire and Movement- when to use fire and movements tactics, Basic considerations, Appreciation of ground cover, Types of cover, Dead ground, Common Mistakes, Map and air photography, Selection of Fire position and fire control.

(c) **Unit 3. Map Reading(Contact Hrs. 04)**.Google Maps & applications

(d) **Unit 4. Weapon Training(Contact Hrs. 04)**.Short Range firing

(e) **Unit 5. Social Service and Community Development (Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and State level.

(f) Unit 6. Health & Hygiene(Contact Hrs. 05)

(i) Yoga- Introduction, Definition, Purpose, Benefits.

(ii) Asanas-Padamsana, Siddhasana, Gyan Mudra, Surya Namaskar, Shavasana, Vajrasana, Dhanurasana, Chakrasana, Sarvaangasana, Halasana etc.

(h) Unit 7. Obstacle Training(Contact Hrs. 05)

(i) Obstacle training – Intro, Safety measures, Benefits.

(ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall etc.

SEMESTER VI COURSE MODULE : NATIONAL CADET CORPS VI

Course Title: National Cadet Corps VI			
Course Code	**BNCC06GE03**	**Credits**	**2(Thr)+ 1(Pr)=03**
L /T + P	**30 +30**	**Course Duration**	**1 Semester**
Semester	**VI (Even)**	**Contact Hours**	**30(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

127. **Course Objectives**. Cadets will be able to: -

(a) Get acquainted about counselling process its need and importance.

(b) Know about SSB procedure and different tasks and tests.

(c) Know about the conduction during the interview.

(d) Understand the security challenges & role of cadets in Border Areas.

(e) Know about the modes of entry in Armed forces, CAPF & police.

(f) Understand the life history & leadership qualities of great generals.

(g) Learn about 1999 Kargil war.

(h) Acquire the knowledge about various wars and their heroes.

(i) Know about various components of communication process.

128. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Get motivated to join Armed forces, police & CAPF.

(b) Write their CV effective and appealing.

(c) Face SSB interview effectively in their future.

(d) Understand individaul responsibilities & role in meetings the security challenges on Border/Coastal areas.

(e) Imbibe the feeling of patriotism.

(f) Communicate more effectively.

129. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.3)**.

(i) Career Counselling.

(ii) SSB Procedure.

(iii) Interview Skills.

(b) **Unit 2. Border & Coastal Areas(Contact Hrs.2)**. Security Challenges & Role of cadets in Border management.

(c) **Unit 3. Armed Forces(Contact Hrs. 3)**. Modes of Entry into Army, Police and CAPF.

(d) **Military History(Contact Hrs. 19)**.

(i) Biographies of Renowned Generals.

(ii) War Heroes : Param Veer Chakra Awardees.

(iii) Study of Battles of Kargil.

(iv) War Movies.

(e) **Communication(Contact Hrs. 3)**.Introduction to Communication & Latest Trends.

Course Content Part (II) Practical

130. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of ceremonial drill.

(c) Know about various knots and lashing used in soldiering.

(d) Acquire awareness about the basic weapon system in use in the Armed Forces.

131. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform foot drill and follow the different word of command.

(b) Aiming range and figure targets.

(c) Use the different knots and lashing in day-to-day life for different purposes.

(d) Develop the feeling of altruism.

132. **Course Content Part (II) Practical**.

(a) **Unit 1. Drill (Contact Hrs. 03)**.

(i) Ceremonial Drill.

(ii) Guard of Honour.

(b) **Unit 2. Weapon Training(WT) (Contact Hrs. 04)**.Short Range firing.

(c) **Unit 3. Map Reading(MR) (Contact Hrs. 04)**. Google maps and Applications.

(d) **Unit 4. Field Craft & Battle Craft(FCBC) (Contact Hrs. 03)**. Knots, Lashing and Stretchers.

(e) **Unit 5. Social Service and Community Development(SSCD) (Contact Hrs. 05)**. Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) **Unit 6 Introduction of Infantry Weapons &Equipment(INF) (Contact Hrs.03)**. Characteristics of 5.56MM INSAS Rifle, Ammunition, Fire Power, Stripping, Assembling & Cleaning Practice.

(g) Unit 7. Communication (COM) (Contact Hrs. 03).

(i) Basic Radio Telephony (RT) Procedure.

(ii) Introduction, Advantages, Disadvantages, Need for standard procedures.

(iii) Types of Radio telephony communication.

(iv) Radio telephony procedure, Documentation.

COURSE MODULE: NATIONAL CADET CORPS CAMP -I

Course Title: National Cadet Corps Camp I			
Course Code	**BNCCCAMP03GE05**	**Credits**	**2(Thr)+ 3(Pr)=05**
L /T + P	**30+90**	**Course Duration**	**10 Days (24 hours each)**
Semester	**III (Odd)**	**Contact Hours**	**30(Thr)+90(Pr)=120Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

133. **Course Objectives**.Cadets will be able to: -

(a) Acquire knowledge about the various aspects of personality development.

(b) Understand the concept of leadership traits, moral values and character traits.

(c) Develop awareness about the various types of natural disasters.

(d) Develop sensitivity to the changing environment and understand the importance of conservation.

(e) Understand the importance of hygiene and sanitation and common first aid procedures.

(f) Acquire awareness about various types of weapon systems in the Armed Forces.

134. **Expected Learning Outcomes**.After completing this course, the cadets will be able to: -

(a) Acquire adequate skill sets to overcome their weakness and reshape their personality.

(b) Imbibe good moral values and character traits in their daily life.

(c) Become useful members of the society and form part of disaster response team, if need arises.

(d) Respect and make efforts to conserve natural resources

(e) Follow good personal hygiene practices and provide first aid in emergencies.

(f) Be motivated to join the armed forces.

135. NCC Camp-I : Course Content Part (I) Theory

(a) **Unit 1. Personality Development (PD) (Contact Hrs. 04)**. Introduction to Personality Development, Factors influencing/shaping personality, Time Management and Interview Skills.

(b) **Unit 2. Leadership (LDR) (Contact Hrs. 04)**. Leadership Traits, Moral Values and Character Traits.

(c) **Unit 3. Disaster Management (DM) (Contact Hrs. 04)**. Assistance during natural disasters, Do's and Don'ts forNCC Cadets performing Disaster Management Duties

(d) **Unit 4. National Integration and Awareness (NIA)(Contact Hrs. 04)**. Water Conservation and Rain Harvesting, Waste Management an Energy Conservation

(e) **Unit 5. Health and Hygiene (H&H)(Contact Hrs. 04)**. Hygiene and Sanitation, First Aid in Common Medical Emergencies.

(f) **Unit 6. Infantry Weapons (IW) (Contact Hrs. 02)**. Characteristics of Company Support Weapons.

(g) Unit 7. Weapon Training (WT) (Contact Hrs. 04). Characteristics of Point 22 Rifle and its Ammunition, Range Procedure and Safety Precautions**.**

(h) **Unit 8. Military History (MH) (Contact Hrs. 04)**. Guest lectures by War Veterans/decorated soldiers/veterans.

(i) **Unit 9. Communication (COM) (Contact Hrs. 04)**. Basics of communication.

NCC Camp-I : Course Content Part (II) Practical

136. **Course Objectives**. Cadets will be able to: -

(a) Understand that drill is the foundation of discipline and command a group for a common goal.

(b) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(c) Develop awareness about different types of terrain and how it is used in Battle Craft.

(d) Develop the concept of various markings on the map and how they are co-related to the ground features.

(e) Acquire awareness about the various types of weapon systems in the Armed Forces.

(f) Understand the concept and importance of social service.

(g) Understand the various nuances of Personality Development.

(h) Understand the concept and importance of Physical Training in everyone's life.

(i) Acquire skill sets about various games and understand the importance of team work.

(j) Develop awareness about different cultures and different modes of its projection in artistic forms.

137. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Perform foot drill, arms drill, ceremonial drill and will be able to give out different words of command.

(b) Fire a weapon effectively with fair degree of marksmanship.

(c) Undertake point to point navigation and take part in route marches by day and night.

(d) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(e) Be motivated to join the armed forces.

(f) Acquire adequate skill sets to overcome their weakness and enhance their personality.

(g) Gain adequate physical and mental endurance capabilities.

(h) Play team games and be able to communicate and coordinate effectively in group events or situations.

(i) Respect the diversity of Indian culture and develop pride by showcasing their own culture to others.

138. NCC Camp-I : Course Content Part (II) Practical

(a) **Unit 1. Drill (Drill)(Contact Hrs. 16)**. Drill ki Aam Hidayaten aur Words of Command, Savdhan, Vishram, Aram Se aur Mudna, Khuli Line aur Nikat Line mein march, Salute Karna Parade Par, Visarjan aur Line Tod, Tej Chal, Tham aur Dhire Chal, Tham, Dahine, Baen, Aage aur Piche Kadam lena, Tejchaal se Mudna, Tejchaal se Salute karna, Tej kadamtaal aur Tham, Tej Kadamtaal se kadam badhana, Teenon Teen se ek file Banana aur ek file se Teenon Teen Banana, Rifle Ke Saath Saavdhan, Vishram aur Aaram se, Rifle ke saath Parade par aur saaj, Rifle Ke saath visarjan aur line tod, Bhumi Sashtra aur Uthao Sashtra, Bagal Sashtra aur Baaju Shastra.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 14)**. Stripping, Assembling, Cleaning of Point 22 rifle, Sight Setting and Sight Picture of Point 22 Rifle, Loading, Cocking and Unloading, Lying Position, Holding and Aiming of Point 22 rifle, Trigger Control and Firing of Shot, Theory of Group, Short-Range Aiming and Firing, Firing Practice I to VII.

(c) **Unit 3. Field Craft & Battle Craft (FC/BC) (Contact Hrs. 06)**.Introduction of Field Craft & Battle craft, Judging Distance, Indication of Landmarks and Targets, Observation, Camouflage and Concealment, Field Signals, Section formations.

(d) **Unit 4. Map Reading (MR) (Contact Hrs. 12)**. Introduction to Map and Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Types of Bearing and use of Service Protector, Prismatic Compass and its use, setting of a map, Finding North and own Position, Map to Ground and Ground to map, Point to Point march, Route March – I, Route March -II.

(e) **Unit 5. Infantry Weapons (IW) (Contact Hrs. 01)**. Characteristics of Battalion Support Weapons.

(f) **Unit 6. Social Service and Community Development (SSCD) (Contact Hrs. 04)**. Basics of Social Service and its need, Rural Development Programme, Civic Responsibilities: Cadets will participate in various activities throughout the camp e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc., Road /Rail Travel Safety

(g) **Unit 7. Personality Development (PD) (Contact Hrs. 06)**.Self-Awareness, Empathy, Critical and Creative Thinking, Decision making and problem Solving, Coping with Stress

and Emotions, Time Management.

(h) **Unit 8. Obstacle Training (OT) (Contact Hrs. 02)**. OT Practice – I:- Untimed, Cadets will be familiarized with all the obstacles in the Obstacle Course and briefed about the correct method to do them, OT Practice -II: Timed practice for all the cadets and record to be maintained.

(i) **Unit 9. Physical Training (PT) (Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in morning hours. Training has to be progressive in degree of difficulty to improve individual stamina and endurance. Training to include warming up, running, exercises to strengthen upper body, lower body and core muscles. Two period each to be devoted to route march by day and night respectively and one period will be earmarked for trekking expedition as part of Adventure Activity.

(j) **Unit 10. Games Training (G)(Contact Hrs. 09)**. Games Training will be carried out on each day of the camp, except on last day, in evening hours. Training has to be progressive in degree of difficulty to improve individual skills, coordination, team work and desire to excel. Training to ensure that each and every boy and girl cadets participate in at least one game activity everyday.

(k) **Unit 11. Cultural Activity (C)(Contact Hrs. 09)**. Cultural Activity will be carried out on each day of the camp, except on last day, in evening hours. Cadets have to divided in Nine Groups consisting of a mix of boy and girl cadets and preferably belonging to the same geographical area. Each group has to present the unique culture, custom, tradition, folk lore, songs, drama, paintings and cuisine during one hour allotted. There will be a prize for the best group to encourage participation and to develop pride in their unique culture. This training activity should ensure that each and every boy and girl cadet participate in at least one game activity every-day.

(l) **Unit 12. Spare (S)(Contact Hrs. 02)**. Two periods in each camp will be earmarked as spare to cover disruptions in training activity due to weather or other administrative reasons.

COURSE MODULE : NATIONAL CADET CORPS CAMP – II

Course Title: National Cadet Corps Camp II			
Course Code	**BNCCCAMP05GE05**	**Credits**	**2(Thr)+ 3(Pr)=05**
L /T + P	**30+90**	**Course Duration**	**10 Days (24 hours each)**
Semester	**V (Odd)**	**Contact Hours**	**30(Thr)+90(Pr)=120Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (II) Theory

139. **Course Objectives**.Cadets will be able to: -

(a) Acquire the concept self-awareness, emotional intelligence, critical and creative thinking, decision making and problem solving.

(b) Learn about various indicators of good leadership and get an insight on principle of leadership and motivation.

(c) Develop awareness about the various types of natural disasters and disaster management organization in our country.

(d) Familiarize with natural resources, changing environment and understand the importance of conservation and waste management.

(e) Value the importance of Physical and Mental health and understand how to deal with wounds of various types.

(f) Acquire awareness about organization and role of an Infantry Battalion in the Armed Forces.

140. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Develop a sense of responsibility, smartness in appearance and improve self-confidence, inculcate importance of empathizing with others, improve their deep-thinking ability and apply ideas and be able to face problems in a constructive manner with solutions.

(b) Imbibe good leadership traits and apply them in practical life and appreciate the visible outcome of leadership and motivation.

(c) Appreciate role of the org during emergency and become useful members of disaster response team, if need arises.

(d) Learn about the various natural resources, their utilization and practice method of conservation of these resources in daily life.

(e) Appreciate value of physical and mental health in daily life and spread awareness about treatment and care of wounds in their society.

(f) Be motivated to join the armed forces.

141. **NCC Camp-II : Course Content Part (I) Theory**.

(a) **Unit 1. Personality Development (PD) (Contact Hrs. 04)**.Self-Awareness, Emotional intelligence, Critical and Creative Thinking, Decision-Making and Problem Solving.

(b) **Unit 2. Leadership (LDR) (Contact Hrs. 02)**. Indicators of Good Leadership, Leadership and Motivation.

(c) **Unit 3. Disaster Management (DM) (Contact Hrs. 02)**. Disaster Management Organization NDMA and NDRF, Types of Disasters.

(d) **Unit 4. Environmental Awareness and Conservation (EAC) (Contact Hrs. 02)**. Natural Resources, Conservation and Management, Water Conservation, Waste Management, Energy Conservation.

(e) **Unit 5. Health and Hygiene (H&H) (Contact Hrs. 02)**. Physical and Mental Health, Treatment and Care of Wounds.

(f) **Unit 6. Infantry Weapons (IW) (Contact Hrs. 01)**. Organization of Infantry Battalion.

(g) **Unit 7. Weapon Training (WT) (Contact Hrs. 02)**. Characteristics of Point 22 Rifle and its Ammunition, Range Procedure and Safety Precautions.

(h) **Unit 8. Military History (MH) (Contact Hrs. 04)**. Guest lectures by War Veterans/decorated soldiers/veterans.

(i) **Unit 9. Communication (COM) (Contact Hrs. 04)**. Latest trends in communication.

NCC Camp-II : Course Content Part (II) Practical

142. **Course Objectives**. Cadets will be able to: -

(a) Inculcate spirit of discipline and follow command as a group for a common goal.

(b) Fire a weapon with adequate safety precautions necessary for safe firing.

(c) Understand the lay of the ground and use it skillfully towards own objective.

(d) Understand and use the map, satellite imagery and GPS effectively.

(e) Identify and be well versed with the primary weapom systems used in the Armed Forces.

(f) Lead a life of selflessness and provide service towards society development and nation building.

(g) Understand the importance of changing mindset, team work, social skills etiquettes and manners, interview skills and importance of effective communication in daily life.

(h) Learn the importance of physical fitness and nuances of physical training.

(i) Inculcate esprit-de-corps through team games.

(j) Have knowledge about cultural diversity of India and learn ways and means to adopt them.

143. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Practice problem solving, critical thinking in real life situations.

(b) Practice leadership of small teams and groups under challenging environment.

(c) Develop a positive attitude, have manners and etiquettes in social life, develop a sense of cooperation for group or team work, participate in an interview with confidence and inculcate verbal and non-verbal communication skills.

(d) Develop adequate physical and mental endurance capabilities.

(e) Fire a weapon effectively with fair degree of marksmanship.

(f) Undertake point to point navigation and take part in endurance marches by day and night.

(g) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(h) Be motivated to join the Armed Forces.

(i) Play team games and be able to communicate and coordinate effectively in group events or situations.

(j) Perform foot drill, arms drill, ceremonial drill and will be able to take part in ceremonial parade and events.

(k) Respect the diversity of indian culture and develop pride by showcasing their own culture to others.

144. NCC Camp-II : Course Content Part (II) Practical

(a) **Unit 1. Drill (Drill) (Contact Hrs. 16)**. Tejchaal se Mudna, Tejchaal se Salute karna, Tej kadamtaal aur Tham, Tej Kadamtaal se kadam badhana, Teenon Teen se ek file Banana aur ek file se Teenon Teen Banana, Rifle Ke Saath Saavdhan, Aaram se, Rifle ke saath Parade par aur saaj, Rifle Ke saath visarjanaur line tod, Bhumi Sashtra aur Uthao Sashtra, Bagal Sashtra aur Baaju Shastra, Salami Sashtra, Squad Drill, Guard Mounting, Guard of Honour, Platoon / Company Drill, Word of Command and Instructional Practice.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 14)**. Stripping, Assembling, Cleaning of Point 22 rifle, Sight Setting and Sight Picture of Point 22 Rifle, Loading, Cocking and Unloading, Lying Position, Holding and Aiming of Point 22 rifle, Trigger Control and Firing of Shot, Theory of Group, Short-Range Aiming and Firing, Musketry Training, Firing Practice I to VII.

(c) **Unit 3. Field Craft & Battle Craft (FC/BC) (Contact Hrs. 06)**. Observation, Camouflage and Concealment, Field Signals, Section formations, Fire Control Orders, Fire and Movement, Knots and Lashings.

(d) **Unit 4. Map Reading (MR) (Contact Hrs. 12)**. Introduction to Map and Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Types of Bearing and use of Service Protector, Prismatic Compass and its use, setting of a map, Finding North and own Position, Map to Ground and Ground to map, Point to Point march, Endurance March – I (10 KM), Endurance March -II (20 KM).

(e) **Unit 5. Infantry Weapons (IW) (Contact Hrs. 01)**. Characteristics of Infantry Company support weapons and 5.56 MM INSAS Rifle.

(f) **Unit 6. Social Service and Community Development (SSCD)(Contact Hrs. 04)**. Contribution of Youth Towards Social Welfare: Cadets will participate in various activities throughout the camp e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc., Social Evils: Female Feticide, Dowry, Child Abuse, Trafficking and Corruption, Drug Abuse and Drug Trafficking, Protection of Children and POCSO Act 2012.

(g) **Unit 7. Personality Development (PD)(Contact Hrs. 06)**. Change Your Mindset, Team Work and Team Building, Social Skills, Etiquettes and Manners, Interview Skills, Communication Skills–I, Communication Skills -II

(h) **Unit 8. Obstacle Training (OT)(Contact Hrs. 02)**. OT Practice – I: Untimed, Cadets will be familiarized with all the obstacles in the Obstacle Course and briefed about the correct method to do them, OT Practice -II: Timed practice for all the cadets and record to be maintained.

(i) **Unit 9. Physical Training (PT) (Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in morning hours. Training has to be progressive in degree of difficulty to improve individual stamina and endurance. Training to include warming up, running, exercises to strengthen upper body, lower body and core muscles. Two period each to be devoted to route march by day and night respectively and one period will be earmarked for trekking expedition as part of Adventure Activity.

(j) **Unit 10. Games Training (G)(Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in evening hours. Training has to be progressive in degree of difficulty to improve individual skills, coordination, team work and desire to excel. Training to ensure that each and every boy and girl cadets participate in at least one game activity everyday

(k) **Unit 11. Cultural Activity (C) (Contact Hrs. 09)**. Cultural Activity will be carried out on each day of the camp, except on last day, in evening hours. Cadets have to divided in Nine Groups consisting of a mix of boy and girl cadets and preferably belonging to the same geographical area. Each group has to present the unique culture, custom, tradition, folk lore, songs, drama, paintings and cuisine during one hour allotted. There will be a prize for the best group to encourage participation and to develop pride in their unique culture. This training activity should ensure that each and every boy and girl cadets participate in at least one game activity every day (Contact Hrs. 09)

(l) **Unit 12. Spare (S) (Contact Hrs. 02)**. Two periods in each camp will be earmarked as spare to cover disruptions in training activity due to weather or other administrative reasons.

SECTION II : RULES AND REGULATIONS

GOVERNING NCC CREDIT COURSE UNDER CHOICE BASED CREDIT SYSTEM AS GENERIC ELECTIVE FOR SENIOR DIVISION/WING

RULE 1 :Definitions of Key Terms

General Definitions

'Choice Based Credit System' (CBCS).The CBCS provides choice for the student to select courses from the prescribed courses (Elective or Soft – Skill courses). It provides a 'Cafeteria' approach in which the students can take courses of their choice, learn at their own pace, study additional courses and acquire more than the minimum required credits, and adopt an inter-disciplinary approach.

'Academic Year'.Two consecutive (one odd + one even) semesters shall constitute one academic year.

'Credit Course'.Course, usually referred to as paper having specific title and code number, is a component of a programme. It consists of a list of topics/concepts/theories/principles/activities/tasks etc. which a student has to learn during the programme of study. Each course has some credits according to the nature and load of content. Each course should define the learning objectives/learning outcomes. A course may be designed to be delivered through lectures/tutorials/laboratory work/field work/out reach activities/project work / vocational training / physical training /viva / seminars /term papers / assignments / presentations / self-study work etc., or a combination of some of these.

'Course Instructor/Teacher'.The course instructor generally will be a teaching faculty who has taken up the responsibility of teaching it and evaluating the performance of the students in that course. NCC course will be imparted by the ANO (Associate NCC Officer) and PI (Permanent Instructor) / Girl Cadet Instructor (GCI) staff together according to their area of specialization. Certain specific topics and training activity is imparted by Military Officers and Whole Time Lady (WTLO).

'Credit'.A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work per week. Thus, in each semester's NCC course, credits are assigned on the basis of the number of lecture/tutorial/field work/physical training/excursions and other forms of learning required for completing the contents in a 15-18 week schedule. 2 hours of laboratory work/field work is generally considered equivalent to 1 hour of lecture.

i. 1 credit = 1 hour of instruction per week (1 credit course = 15 contact hours of instruction per semester)

ii. 4 credit = 4 hour of instruction per week (4 credit course = 60 contact hours of instruction per semester)

iii. 1 credit = 2 hour of practical per week (1 credit course = 30 contact hours of instruction per semester)

iv. 4 credit = 8 hour of practical per week (4 credit course = 120 contact hours of instruction per semester)

Number(s) of credit(s) assigned to a particular course are mentioned in the detailed syllabus of the courses.

'Credit Point'.It is the product of the grade point and the number of credits for a course.

'Letter Grade'.It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P, and F. A letter grade is assigned to a student on the basis of evaluation of her/his performance in a course on a ten-point scale.

'Grade Point'.It is a numerical weight allotted to each letter grade on a 10 -point scale.

Letter Grade	Grade Point
O	9-10
A+	8-9
A	7-8
B+	6-7
B	5-6
C	4-5
P	4
F	0
Ab	0

Note : University may use the above said criteria for providing the grades to the students or may adopt the same criteria which they are practicing for providing the letter grade and grade point for other subjects.

'Programme'.An educational programme leading to the award of degree, Diploma or Certificate course. NCC course shall be offered only at under graduate level programmes for any stream or type of programme for example – Nonprofessional courses BA, B.SC. B. Com etc. professional courses – B.A., LLB, B.A./B.Sc., B.Ed., BCA, BBA, B. Tech, MBBS etc.

'Credit – Based Semester System (CBSS)'.Under the CBSS, the requirement of awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.

'Semester'.Each semester shall consist of 15 to 16 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June. The Credit-based semester system provides flexibility in designing curriculum and assessing credits based on the course content and hrs of teaching.

'Semester Grade-Point Average (SGPA)'. Semester Grade Point Average or SGPA, is an average grade point earned by the student at the end of an academic session i.e. semester at college. The formula for calculation of SGPA is the sum of all the credit points awarded for the subjects divided by total credits allotted to that semester. It shall be expressed up to two decimal places.

'Cumulative Grade Point (CGPA)'. It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all the semesters. It shall be expressed up to two decimal places.

'Transcript/ Grade card or certificate'. Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade and / or marks secured) along with SGPA of semester. Overall Grade Certificate will be issued on completion of the course showing semester wise SGPA & CGPA.

'The University/ College/ Institution'. The University/ College/ Institution in present document means the any recognized central/ state/ Deemed university or institution meant for higher education.

'NCC Course'. In the present document 'NCC Course' means the course designed for imparting NCC curriculum in educational institutions as elaborated in this document under Choice Based Credit System as a General Elective Course for Senior Division/ Senior Wing.

Definitions Specific to NCC

'Institutional Training'. Implies training conducted for NCC cadets as per Training Manuals and Cadet Hand Book issued by DG NCC, Ministry of Defence.

'Common Subjects'. Implies those subjects specifically taught in NCC curriculum which are common to Army, Navy and Air Force and general training that can be imparted by Associate NCC Officers or Military staff or a suitably qualified person.

'Specialised Subjects'. Implies subjects specifically taught in NCC curriculum by military instructors comprising specialised topics for Army, Navy and Air Force Cadets respectively.

'NCC Camps and Centralised Training Events'. Collective training events conducted usually for 10 days with large number of cadets living under field conditions in selected places away from home. The training camp comprises of focused physical and mental training routines of different types as per syllabus and curriculum. Some training like route marches may happen overnight. Camps include, adventure camps, national integration camps,

Republic Day Parade Training Camps, ThalSainik, VayuSainik and NauSaink camps and other outdoor training activities as described in DG NCC Training Manuals.

NCC 'B' and 'C' Certificate Examinations. These are defined in Special National Cadet Corps Order 2020 issued by DG NCC, Ministry of Defence.

'Training Faculty'.Persons suitably trained & responsible for imparting training of different types and nature to students.

'Military Officers'. They are regular commissioned officers of Indian Armed Forces who serve in the NCC and render command, administrative and instructional functions for NCC.

'Whole Time Lady Officers (WTLO)'. They are women officers commissioned directly into the NCC.

'Associate NCC Officer (ANO)'. ANO will be a university/ college/ school faculty who are qualified in the PRCN (Pre-commission Course of NCC) conducted by DGNCC and are commissioned as Associate Officers in NCC as defined in NCC Act 1948 and NCC Rules. They have the eligibility to impart certain component of NCC Course and undertake training of cadets.

'Permanent Instructor (PI)'. PI Staff are Junior Commissioned Officers (JCO) and Non-Commissioned Officers (NCO) on deputation from Armed Forces to NCC as governed by NCC Act 1948. Retired PI Staff may be hired by a college as a substitute for ANO with prior concurrence of DGNCC.

'Girl Cadet Instructors (GCI)'. GCI are lady instructors' equivalent to PI Staff for specifically imparting instructions to women NCC cadets of Senior Wing.

'NCC Organizational Structure'. NCC is an adjunct of Indian Armed Forces that operates under the ambit of the Ministry of Defence through the Defence Secretary with Raksha Mantri as the political head.

'DGNCC'.Directorate General of NCC renders the command and administrative function of NCC. The executive head of NCC is Director General of NCC who is a Lt Gen rank officer from the Army.

'State NCC Directorate'. State NCC Directorates are directorates subordinate to DG NCC and render command and administrative control to NCC at State level and is headed by an Additional or Deputy Director General

'NCC Group HQ'. NCC Group HQs are subordinate to State Directorates and render command and administrative control to NCC at district or cluster of districts in a state and is headed by a Group Commander.

'NCC Units'. NCC Units are subordinate to Group HQs at the lowest rung of the command and administrative control exercised by military officers and is headed by a Commanding Officer or Officer Commanding. The NCC Units directly engage

with educational institutions and ANOs and are primarily responsible for training of NCC in institutions under their jurisdiction.

'NCC Division/ Wing'. NCC Division/Wing are minor units of senior division/wing of NCC comprising of 160 senior cadets allotted to educational institutions. It can be further subdivided into NCC platoons of 53 to 54 cadets.

'NCC Troop'. NCC Troop are minor units of junior division/wing of NCC comprising of 100 junior cadets allotted to educational institutions. It can be further subdivided into NCC half troops comprising of 50 junior cadets.

RULE 2 : Admission and Other Provisions

The NCC Course under the CBCS as 'General Elective' shall be of three years (Six Semester) duration which may be completed in maximum duration of four year (8 semesters).

Students may complete NCC course minimum in Six semesters and maximum in eight semesters. Cadets may complete their 'B' Certificate in four semesters minimum and maximum six semesters. Cadets already having 'B' certificate may complete their 'C' certificate in minimum two semesters and maximum four semesters, and they may join NCC course 5 in first semester of college.The intake to the course shall be decided according to the seats allotted to University/ college/ institution by DG NCC according to the availability of required infrastructure, faculty and resources.

The admission to the NCC Course under the CBCS as a 'General Elective' shall be governed by the provisions as laid down by the NCC Act 1948/ SNCCO 2020/ contemporary SNCCO and Academic council of parallel body of university. These rules and regulations may be modified from time to time (if needed) by the Academic body of the university in consultation with DG NCC or Act/ Ordinances prepared by DG NCC.

Students will be enrolled as NCC cadet as per existing Acts & Rules.

At the time of reporting for admission, the candidates are required to present medical & physical fitness documents as well as the admission proof of the university and submit the self-attested copies of aforesaid documents.

The admission of any candidate is liable to be cancelled without giving any further notice forthwith or at any time during the period of the course, if it is detected that the candidate has/had produced fake/forged certificate (s)/ document(s), indulged in any act of misconduct/indiscipline and has/had concealed any other relevant information at the time of admission.

The admission of the candidate to the course shall be subject to such ordinance, rules and regulations as may be framed from time to time by the university in consultation with DG NCC and NCC act 1948.

DG NCC shall have jurisdiction in case of any dispute relating to the provisional admission in the course.

RULE3 : For Eligibility, Medium of Instrs & Categories

Eligibility Conditions. Be governed by provisions of NCC Act and Rules and directions from DG NCC from time to time. These are readily available on DG NCC website www.nccindia.nic.in.

Standards for physical Fitness criteria for Male and Female Cadets/students shall be governed by provisions of NCC Act and Rules and policy documents released by DG NCC from time to time.

RULE4 : Medium of Instruction. English or Hindi. However, ANOs and training instructors are free to use vernacular language for helping students who are not fluent in Hindi or English.

RULE 5 : Course and Students. NCC course is unique, due to the nature of its military training content and component hence it is normally offered to students enrolled as NCC cadets only. This NCC Course is primarily designed for students enrolled as NCC cadets under provisions of NCC Act 1948. Institution allotted NCC will have the obligation to offer this course to all students from their institute enrolled as cadets as per vacancy allotted to the institution by DG NCC as also to those cadets enrolled under Open Quota seats.

RULES 6 :NCC Course for 'Cadet' Category 6.1. NCC Course for 'Cadet'

(a) NCC course for Cadets comprises of total 24 credits (08 for theory, 06 for practical and 10 for camp component) over 6 semesters courses i.e., NCC course I to NCC course VI and NCC Camp I & NCC Camp II.

(b) Cadets will not only earn the academic credits but also be given 'B', and 'C' Certificates after passing the exam conducted by DG NCC.

(c) Students would be free to join NCC Course I or subsequent Courses in any semester, not necessarily Semester I or the designated Semester.

(d) A student can opt for only one of the six Courses per semester and that too sequentially implying NCC Course II cannot be joined before completing NCC Course I and so on.

(e) Under this category a fresh student/cadet will compulsorily have to opt for all six NCC Courses in minimum six Semesters. However, 'B' certificate holder may directly join NCC Course Number 5 in any semester. He will have to complete NCC Course Number 5 and NCC Course Number 6 for obtaining 'C' certificate and he will be awarded credit points only for NCC Course Number 5 and NCC Course Number 6.

NCC GENERAL ELECTIVE CREDIT COURSE DESIGN SUMMARY					
Semester	Credits Allocated			Total	Remarks
	Theory	Practical	Camp		
Semester - I	1	1		2	
Semester - II	1	1		2	
Semester – III	1	1	5	7	Credits of 1st Camp merged with 3rd Sem
Semester – IV	2	1		3	
Semester – V	1	1	5	7	Credits of 2nd Camp merged with 5th Sem
Semester - VI	2	1		3	
Total	**08**	**6**	**10**	**24**	**Twenty-Four Credits**

RULE 7 :Mobility& Credit Bank

The mobility shall be permissible from the regular mode programme to the regular mode programme of learning only and cannot be replaced by open/distance/online programme.

It shall be the responsibility of the student to assess the feasibility and practicality of vertical mobility (across the Universities), as it doesn't entitle a student to be exempted or relaxed from any of the requisites (sessional, attendance, assignments, End-semester examinations and programme duration etc.) for completing the course.

After completing one semester/ one year cadet/student may pursue NCC course from any other institution/ University/ College having NCC and carry credits in credit bank as per NEP 2020. The NCC students/ Cadets of some other university shall in any case be admitted only at the beginning of the session to the fulfilment of the other requirements of the NCC Course (attendance, Formative assessment, Field-work, practical etc).

A student of NCC course availing inter-university mobility shall continue to be a bonafide student of the university where he/she initially got admission and as per the university/ Institutional rules for the inter-university mobility.

In case of inter-university mobility of NCC cadet for NCC Course is also the subject to availability of NCC for the cadets in that particular university/ institution and it shall be interpreted as inter-battalion migration (means another regimental no. shall be allotted to the cadet).

RULE 8 :Examination & Promotion

The examination of all the NCC courses shall be internal in nature and generally consisting of continuous internal assessment and End of semester Examination. For the preparation of final grade in a particular course, the continuous internal assessment (Formative in nature) and the End Semester Examination (Summative in nature) shall have the weightage as decided for other courses by the university as per the University norms for e.g., 25% internal assessment and 75% End of term exams or 30% internal assessment and 70% End of term exams etc.

For assigning the Grades and credit points to NCC Course Universities/ Institutions are free to use the same criteria which are decided by their academic bodies for providing the grades and credit points to the other courses

RULE 9 :Continuous Internal Assessment

The Continuous Internal Assessment of the NCC Cadets' and NCC students' learning and performance shall be carried out by the ANOs and PI staff.

Continuous Internal Assessment will be 100% Practical that includes Drill Square test, Map Reading, Weapon Training, Field craft & Battle craft.

CO of nominated NCC Unit will be deemed as Head of the Department and shall be responsible for approving the schedule and pattern of the continuous internal examination.

ANO of the nominated institute shall maintain all the records related to attendance, teaching and assessment in a systematic manner, including award of final grade.

In case a student fails to appear in any Continuous Internal Assessment, they will be given a chance to reappear in retest and in case he/she fails to obtain 'P' grade he/she will be made to repeat the exam by carrying it forward for semester retest .

RULE 10 :Re-appear in the End Semester Examination for Improvement of Grades

If a student wishes to improve her/his grade(s) in NCC course(s), she/he can re-appear in the End Semester Examination in the subsequent odd/even semester(s), whenever the examination of the particular course(s) is held, on payment of fees in addition to the prescribed semester fee within the maximum permissible duration for the programme of study of the student/cadet.

A student may improve her/his points/grade by reappearing in the End Semester Examination of a course as per the provisions of reappearing mentioned above. In such cases points obtained by the student in the Continuous Internal Assessment of the particular course shall be carried forward to the subsequent End Semester Examination of the course. However, in such case, the points/grades obtained on the basis of latest appeared End Semester Examination shall be considered for calculation of final CGPA of the programme.

The re-appear examination of a course for improvement of grade shall be based on the syllabi of the course in force at the time of initial registration to the course.

A student who has got the Migration/Transfer Certificate issued from the University shall not be allowed to re-appear in any examination for improvement of grade.

RULE 11 :Repeating Courses

A student having attendance shortage in any course may repeat the course by taking re-admission in that course in subsequent odd/even semester(s), whenever the course is being offered, within the maximum permissible duration of the programme.

If a student repeats a course, she/he has to fulfil all the desired requirements afresh including attendance, Continuous Internal Assessment and the End Semester Examination. In such case the course content shall be based on the syllabi of the course in force at the time of repetition of the course.

RULE 12 : Promotion Rules

A student shall be declared as 'promoted' to the next semester when she/he earns 'P' Grade or above in the last concluded semester examination, maintaining the spirit and pattern of semester system and covering the mandatory components, such as Continuous Internal Assessment and End-Semester Examination in the NCC Courses.

A student shall be 'Provisionally Promoted' to the next semester if she/he secures less than 'P' grade but he /she has to pass all the courses of NCC course within permissible duration.

A cadet shall be eligible to attend the 'B' Certificate exam if he/she passed all the first four semester NCC course and completed one ATC/CATC. Similarly, cadet will be eligible to attend 'C' certificate examination if he/she has 'B' certificate and he /she has passed V, VI semester NCC course and attended one CATC/ATC after fourth semester and after having obtained 'B' certificate.

If a cadet/student is repeating a course in an academic session, whatever may be the reason, it shall not be counted in the total number of seats and shall not affect the fresh intake of cadets / student in that academic session.

RULE 13 :Computation of SGPA & CGPA

13. Computation of SGPA and CGPA . University may use their own criteria for giving the SGPA & CGPA which is prepared by the authorised academic body for the other courses.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

SUBJECT CODE – MC 5 (C)

CATEGORY – NNP

SUBJECT NAME – PHYSICAL EDUCATION

SEMESTER – V

ANATOMY AND FIRST AID

UNIT-1

1. Introduction and Structural Organization of Human body:

Introduction:

Meaning and Concept of Anatomy.

Need and Importance of the Knowledge of Anatomy in the Field of Physical Education.

Levels of Organization of Human Body:

Definition of Cell, Tissue, Organ and System.

Microscopic Structure, Composition and Function of Cell.

Essential Properties of living Organism.

Classification, Structure and Function of Tissues:

Epithelial tissue

Connective Tissue

Muscular Tissue

Nervous Tissue

UNIT-II

2. Musculo-skeletal System:

Skeleton

Different Parts of Human Skeleton.

Types of Bones.

Gross And Microscopic Structure and Function of Bones.

Joints

Joint's Nomenclature and Classification.

names of the Movements around Joints.

Structure of the Typical Synovial Joint.

Muscles

Structure and Function of Skeletal Muscles.

Names of Major Muscles of Different parts of Body.

UNIT-III

3. Cardio- respiratory, Digestive & Excretory system:

Circulatory System:

Anatomical Position and Gross Structure of the Heart.

Systemic and Pulmonary Circulation.

Blood Vessels- Artery, Vein Capillaries

Respiratory System:

Meaning of External and Internal Respiration

Organs of Respiration

Introduction to Mechanism of Respiration

Digestive System:

Parts of Digestive Tract, Structure and Function in brief

Steps of Digestion

Digestive Glands- Structure and Function

Excretory System:

Routes of Excretion from Human Body-

Organs of Urinary System.

Structure and Function of Kidney.

4. Neuro-Humoral & Reproductive System:

Nervous System:

Structural and functional Divisions of Nervous System.

Sensory Motor Nervous System.

Parts of Brain.

Structure and Functions of Spinal Cord.

Sense Organs- Eyes, Ears & Skin.

Endocrine system:

Names, Location and Functions of -

Pituitary Gland

Thyroid gland

Adrenal Gland

Pancreas

Reproductive System:

Primary and Secondary Male and Female Reproductive System.

Testes and Ovary.

UNIT-V

5. First - Aid:

Injuries:

Types of Wounds

Pressure Points

Role of lce

Dressing and Bandages

Musculo-skeletal Injuries

Sprain

Strain

Dislocations/Subluxation

Types of fractures & their Managment (Application) of splints)/

Shock:

Common Causes

Signs and Symptoms

Immediate Management

Concept of Artificial Respiration.

Transportation of Severely Injured patients.

Snake Bite and Insect Bite.

HEALTH EDUCATION

UNIT-I

Health

Concept of Health

Dimensions of Health

Spectrum of Health

Positive Health

Determinants of Health

Health Education

Concept, aims objectives and scope

Principles of Health Education

Methods of Communication in Health Education

UNIT-II

Health Problems

Communicable and non-communicable diseases

Nutrition

Environmental sanitation

Medical care

Population

An Introduction to Organization and Administrative set-up of Health System in India.

National level

State Level

District Level

Steps of Planning of Health Education Programme.

UNIT-III

Personal and Environmental Hygiene

Care of skin, mouth, nails, clothing, bathing etc.

Importance of rest sleep and exercise.

Community Health

Brief account of housing, water supply, sewage and refuse disposal

School Health Service

Common Health Problems.

Objectives of School health service

Aspects of School Health Service

Health Appraisal.

Remedial Measures and Follow-up.

Prevention of Communicable Diseases.

Healthful School Environment

Nutritional Services.

First Aid and Emergency Care

Eye Health Service

Health Education

Education of Handicapped Children

School Health Records

UNIT-IV

4. Nutrition.

Classification of Foods

Proximate Principles and role of various nutrients

Balanced diet

Balanced diet of Indian School Children

Malnutrition Adulteration of Food.

UNIT-V

Family Planning

Concept, need and importance

Role of Health Education in Family.

Sex Education

Concept need and importance of sex education at school level.

National Health Programme in India (Breif description)

NMEP (National Malaria Eradication Programme)

DDCP (Diarrhea Diseases Control Programme)

National TB Control Programme

STD Control Programme.

NFPF National Family Planning Programme.

International Health Agencies.

WHO

UNICEF

UNDP

TAEKWONDO

1. **Define Taekwondo, historical development of Taekwondo, Philosophy of Taekwondo.**
2. **Belt Promotion, Dress, oath, Tents of Taekwondo, equipments, and facilities used in Taekwondo.**
3. **Player Stance- walking, extending walking, L stance.**
4. **Fundamental Skills- Sitting stance punch, double punch, triple punch.**
5. **Bocks, Striks.**
6. **Punching Skill from sparring position- front- fist punch, rear fist punch, double punch, and four fist punch, double punch, and four combination punch.**
7. **Foot Tenchniques (Balgisul)- standing kick (soseochagi), Front kick (A P Chagi(, Arc kick (Bandal Chagi), Side kick (Yeop Chagi), Turning kick (Dollyo Chagi), Back kick (Twit Chagi), Reverse turning kick (Bandae Dollyo Chagi), Jump kick (Twimyo Chagi).**
8. **Pumsae (Forms) - Jang, Yi Jang, Sam Jang, Sa Jang, O Jang, Yook Jang, Chil Jang, Pal Jang**

(Fundamental Movement- eye control, concentration of spirit, speed control, strength control, flexibility, balance, variety in techniques).

9. **Sparring (gyeorugi)- One Step sparring (hand techniques, foot techniques, self defense techniques, (hosinsul), combination kicks and Free Sparring.**
10. **Board Breaking (gyeokpa)- eye control, balance, power control,speed, point of attack.**
11. **Competition Rules and their interpretation and duties of officials.**
12. **Stretching, Relaxation and Meditation exercises.**

Athletics II

1 Introduction of Track & Field Athletics and Historical development of events with special reference to India.

2 Organizational set-up of Track and Field Athletics at National Level.

3 Important tournaments held at National and International levels.

4 Fundamental Skills

a. Field events.

i. Technique of Long Jump (Sail technique, Hang technique) Approach run, take off, flight and landing.

ii. Technique of Shot Put (O Brien technique) Grip, Stance, Glide, Release and Reverse.

iii. Technique of Triple Jump- Approach Run, Take-off, Hop, Step and Jump.

iv. Technique of Discus throw

Grip, stance, swing, Release and Reverse.

v. Technique of High Jump (Straddle roll)

Approach run, take off, Bar clearance and landing.

vi. Technique of Javelin Throw (Grip, Carry, Approach and Five Stride Rhythm)

vii. Technique of Pole-Vault (Grip, Approach, Take-off, Bar) Clearance and Landing)

viii. Technique of Hammer Throw (Grip, Preliminary Swings, Turns, Release and Recovery)

4.2 Brief Introduction about Combined events (Heptathlon and Decathlon)

5 General Competition Rules of track and field events.

6 Marking for Track & Field Events.

GYMNASTICS

1. **Introduction of the game and historical development with special reference to India.**
2. **Important tournaments held at National and International levels and distinguished personalities related to the game.**
3. **Fundamental Skills.**

Floor exercise-

Forward roll.
Backward roll.
Sideward roll.
Cart Wheel.
Hand stand and forward roll,
Backward roll to hand stand.
Diving forward roll.
Side split.
Head stand.
Different kinds of scale.
Dive roll from beat board.
Round off.

Parallel Bars-

Mount from one bar.
Straddle walking on parallel bars.
Single and double step walk.
Perfect swing.
Shoulder stand on one bar and roll forward.
Roll side.
Shoulder stand.
Front on back vault to the side (dismount).

Vaulting Horse-

Approach run and jump from the spring board.

Cat vault.

Squat vault.

Straddle vault.

4. **Rules of gymnastics and their interpretations and duties of officials.**

SEMESTER: VI

CATEGORY: PCC

SUBJECT CODE: EI 61(A)

SUBJECT NAME: NANO ELECTRONICS

(60Hrs)

COURSE OBJECTIVE:

The major objectives are to provide students with knowledge and understanding of nano- electronics as an important interdisciplinary subject.

UNIT-I (12Hrs)

Introduction The 'Top down' and 'Bottom up' approach, Why Nanoelectronics?, Nanotechnology potential. Band structure and density of states at Nanoscale: energy bands, density of states at low dimensional structure. Electrical transport in Nanostructure: Electrical conduction in metals, insulator/ionic crystals and semiconductors. Conduction mechanism in bulk, thin film and low dimensional system. Introductory quantum mechanics for Nanoscience: size effect in smaller systems, quantum behavior of nanometric world.

UNIT-II (12Hrs)

Tunnel junction and application of tunneling: Tunneling through a potential barrier, potential energy profiles of material interfaces, applications of tunneling. Quantum wells, wires and dots: Semiconductor hetrostructure and quantum wells, quantum dots and nanoparticles.

UNIT-III (12Hrs)

Single electron transistor: Coulomb Blockade, single electron transistor, other SET and FET structures.

UNIT-IV (12Hrs)

Ballastic and spin transport: Classical and semi-classical transport, ballistic transport, carbon nanotubes and nanowires, transport of spin and spintronics. The era of new Nanostructures of carbon: Buck minsterfullerence, Nanodiomond, BN Nanotubes, Molecular Machine, Nanobiometrics.

UNIT V (12Hrs)

Fabrication technology: Top-down vs bottom-up technology. Lithographic process: Lithography, Nanolithography, split gate technology, self assembly, limitation of lithographic process. Non-lithographic techniques: Plasma arc discharge, sputtering, evaporation, chemical vapour deposition, pulsed laser deposition, molecular beam epitaxy, sol-gel technique, electrodeposition and other process.

COURSE OUTCOMES:

At the end of the course, students will demonstrate the ability to:

1. Understand various aspects of nano-technology and the processes involved in making nano components and material.
2. Leverage advantages of the nano-materials and appropriate use in solving practical problems.
3. Understand various aspects of nano-technology and theprocesses involved in making nano components and material.
4. Leverage advantages of the nano-materials and appropriate use in solving practical problems.

References:

1. G. W. Hanson: Fundamentals of Nanoelectronics, Pearson Education.
2. K. K. Chattopadhyay and A. N. Banerjee: Introduction to Nanoscience and Nanotechnology, PHI Learning.
3. Vlaadiniz U. Mitin: Introduction to Nanoelectronics, Cambridge University Press.
4. M. Dragman and D. Dragman: Nanoelectronics- Principles and devices, Artech House.
5. Karl Goser: Nanoelectronics and Nanosystems, Springer.
6. Daniel Minoli: Nanotechnology application to telecommunication and networking, Wiley Interscience.
7. John H. Davis: Physics of low dimension semiconductor, Cambridge Press. 8. Carl C. Cosh: Nanostructure materials processing property and applications, Noyes Publications.

SEMESTER: VI

CATEGORY: PCC

SUBJECT CODE: EI 61(B)

SUBJECT NAME: INTELLIGENT INSTRUMETATION

COURSE OBJECTIVE: [60Hrs]

This course will provide students with the basic fundaments for high precision measurement of electrical magnitudes (low-level voltage and current systems, measurements over high output impedance systems, high noise level systems, etc...), the principles of analog and digital signal processing (filters, equalizers, low noise amplifiers), as well as the design techniques for computer controlled acquisition systems with a multi-parameter synchronized acquisition.

UNIT -I[12Hrs]

Intelligent versus Dumb instruments, A historical perspective of instrumentation systems. Review of digital transducers. Interfacing microcomputers. Computer ports to high power devices. Optical shaft encoder communication standards. Concepts of Real Time system and its application.

UNIT -II[12Hrs]

Details of Data Acquisition systems (DAS) Logic control systems, Continuous & Batch modes, Single and multi loop controller. Details of Data logger and its application.

UNIT -III[12Hrs]

Architecture of Virtual instrument and its relation to operating system. Software overview: LABVIEW, Graphical User Interface (GUI), Control and indicators: G programming- Data type, Data flow programming editing and running a virtual instrument.

UNIT -IV[12Hrs]

G Programming details in LABVIEW, G Programming tools and libraries. Programming structure: For loop, While loop. CASE structure, Sequence Structure arrays and clusters. Array operations- Bundle/Unbundled String and file I/O. High level and low level I/Os. Attribute nodes, Local and global variables.

UNIT -V[12Hrs]

Software development for Temperature (Low and High), Level, Speed, pressure etc.

COURSE OUTCOMES:

1. The physical mechanism by which a measurement sensor is affected by ambient condition changes must be fully understood and all physical quantities that affect the output must be identified.
2. The effect of each ambient variable on the output characteristic of the primary sensor must be quantified.
3. Suitable secondary sensors for monitoring the value of all relevant environmental variables must be available that will be operate satisfactorily in the prevailing environmental conditions.

References:-

1. Barney G C, Intelligent Instrumentation: Micro processor application in measurement and control,
2. Prentice Hall, Engle Wood Cliff NJ.
3. H S Store, Micro Computer Interfacing, Addison Wesley, Reading, MA Rathore T S, Digital Instrumentation, TMH
4. Interfacing sensors to the IBM PC, Prentice Hall, Engle Wood Cliff NJ. Garry M. Johnson "LABVIEW Graphical Programming", TMH.
5. Lisa K. Wells "LABVIEW for Everyone, PHI.
6. Barry Paton, "Sensor, Transducers and LABVIEW", Prentice Hall.

SEMESTER: VI

CATEGORY: PCC

SUBJECT CODE: EI 61(C)

SUBJECT NAME: DSP PROCESSORS

COURSE OBJECTIVE: [60Hrs]

To make students familiar with the most important methods in DSP, including digital filter design, transform-domain processing and importance of Signal Processors. To make students aware about the meaning and implications of the properties of systems and signals.

UNIT I [12 Hrs]

An introduction to DSP Processors: Advantages of DSP ,characteristics of DSP systems ,classes of DSP applications.DSP processor embodiment and alternatives, Fixed Vs Floating point processors, fixed point and floating point data path.

UNIT II [12Hrs]

DSP Architecture : An introduction to Harvard Architecture, Differentiation between Von-Neumann and Harvard Architecture, Quantization and finite word length effects, Bus structure ,Central Processing UNIT – ALU ,Accumulators ,Barrel shifters, MAC UNIT, compare ,select ,and store UNIT (CSSU) ,data addressing and program memory addressing

UNIT III [12Hrs]

Memory architecture :Memory structures ,features for reducing memory access required ,wait states,external memory interfaces,memory mapping – data memory, program memory, I/O memory memory mapped registers .Addressing: Various addressing modes –implied addressing,immediate data addressing,memory direct addressing ,register direct and indirect addressing and short addressing modes.

Instruction set : Instruction types , various types registers,orhogonality assembly language and application development.

UNIT IV[12Hrs]

Execution Control and pipelining: Hardware looping, interrupts, stack, pipelining and performance,

pipelining depth, interlocking, branching effects, interrupt effects, instruction pipelining,. Peripherals: Serial ports, timers, parallel ports, Bit input/output ports, Host ports, communication ports, on-chip A/D and D/A converters, external interrupts, on-chip debugging facilities, power consumption and management.

UNITV [12Hrs]

Processors: Architecture and instruction set of TMS320C3x, TMS320C5x, TMS320C6x,ADSP21xx DSP chips, some examples programs. Recent trends in DSP system Design: FPGA based DSP system design, advanced development tools for FPGA, development tool for programmable DSP's- An introduction to Code composer studio.

COURSE OUTCOMES:

Acquire knowledge of DSP computational building blocks and knows how to Achieve speed in DSP architecture or processor.Develop basic DSP algorithms using DSP processors. Acquire knowledge about various addressing modes of DSP and are able to program DSP processor

R EFERENCES:-

1.A.V.Oppenheim and R. W. Schafer," Digital Signal Processing", Prentice Hall, 1975

2.L.R.Rabiner and B. Gold," Theory and Application of Digital Signal Processing", Prentice Hall 1989

SEMESTER: VI

CATEGORY: CORE

SUBJECT CODE: EI 62

SUBJECT NAME: VLSI CIRCUITS & SYSTEMS

COURSE OBJECTIVE: [60Hrs]

To bring both Circuits and System views on design together. It offers a profound understanding of the design of complex digital VLSI circuits, computer aided simulation and synthesis tool for hardware design.

1. To understand the fabrication process of CMOS technology
2. To teach fundamentals of VLSI circuit design and implementation using circuit simulators and layout editors.
3. To study various problems due to VLSI technology advancement.
4. To study digital circuits using various logic methods and their limitations.
5. To highlight the circuit design issues in the context of VLSI technology

UNIT-I[12Hrs]

Crystal Growth and Wafer preparation: Wafer terminology, Different crystalline orientations, CZ method, CMOS IC Design flow, Crystal Defects. Fabrication processes of FETs, MOSFETs, and BIMOS etc.

UNIT-II[12Hrs]

Layering: Epitaxial growth methods, Oxidation; Kinetics of oxidation, Thin film fabrication, Metallization; Physical Vapor Deposition, Sputtering.

UNIT-III[12Hrs]

Patterning: Lithography; Optical Lithography, Electron Lithography, X-ray Lithography, Ion Lithography. Photo masking steps, Resists. Doping: Diffusion; Diffusion Models, Ion Implantation; Implantation Equipment, Channeling.

UNIT-IV[12Hrs]

VLSI process techniques and Integration: Floor planning, layout, Design rules, stick diagrams, Test generation, Logic simulation, Introduction to EDA tools. Contamination Control; Clean rooms, HEPA,

ULPA Filters and Class numbers.

UNIT-V[12Hrs]

Subsystem Design: Data-paths; adder, Shift registers ALU, Memory; NVRWM, Flash memories, 6-Transistor RAMs. Latch up in CMOS Circuits.

COURSE OUTCOMES:

1. Demonstrate a clear understanding of CMOS fabrication flow and technology scaling.
2. Design MOSFET based logic circuit
3. Draw layout of a given logic circuit
4. Realize logic circuits with different design styles
5. Demonstrate an understanding of working principle of operation of different types of memories
6. Demonstrate an understanding of working principles of clocking, power reduction and distribution

REFERENCES:-

1.S.K.GanS.K Gan dhi, VLSI Fabrication principles, Wiley.

2.S.M. Sze, VLSI Technology, II edition, McGraw Hill.

3.P.Van Zant, Microchip Fabrication, A Practical Guide to Semiconductor Processing, Third Edition, McGraw Hill.

SEMESTER: VI

CATEGORY: CORE

SUBJECT CODE: EI 63

SUBJECT NAME: POWER ELECTRONICS

COURSE OBJECTIVE: [60Hrs]

Power electronics studies the application of semiconductor devices to the conversion and control of electrical energy. To enable the students to simulate and test the rectifier on different load like resistive, inductive and capacitive.

UNIT I[12Hrs]

Power, Semiconductor Devices

Classification of Power semiconductor devices, characteristics, construction, application and theory of operation of power diode, power transistor, Thyristors. Device specifications and ratings, working of Diac, Triac, IGBT, GTO and other power semiconductor devices. Turn-on / Turn-off methods and their circuits.

UNIT II [12Hrs]

Rectifiers

Review of uncontrolled rectification an its limitations, controlled rectifiers, half wave, Full wave configurations, multiphase rectification system, use of flywheel diode in controlled rectifier configurations.

UNIT III[12Hrs]

Inverters and Choppers

Classification of inverters, Transistor inverters, Thyristor inverters, Voltage and Current Communicated inverters, PWM inverters, Principle of Chopper, Chopper classification and types of regulators.

UNIT IV[12Hrs]

***A. C.* Voltage Controllers and Cyclo-converters**

Classification and operation of AC voltage and Cyclo-converters, their circuit analysis for different type of load.

UNIT V[12Hrs]

Industrial Applications

Solid-state switching circuits, Relays, Electronic Timer, battery charger, Sawtooth generator, applications in Industrial process control, Motor drive applications, Electronic regulators, etc., Induction heating, Dielectric Heating, Resistance welding and welding cycle.

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to

1. Build and test circuits using power devices such as SCR
2. Analyze and design controlled rectifier, DC to DC converters, DC to AC inverters,
3. Learn how to analyze these inverters and some basic applications.
4. Design SMPS.

LIST OF EXPERIMENTS

1 To draw the V-1 characteristics of Thyristor.

2 To draw the V-1 characteristics of Triac.

3 To draw the V-1 characteristics of Diac

4 Study of light dimmer using Triac find out the firing angle and draw the wave forms across load and Triac.

5 Study the operation of an SCR automatic speed control circuit .

6 To draw the V-1 characteristics of IGBT.

7 Study of light dimmer using Diac, find out the firing angle and draw the wave forms across load.

8 Study SCR automatic speed control circuit and see the waveforms on CRO.

9 Study Cyclo-converters.

10 Study PWM inverters.

SEMESTER: VI

CATEGORY: CORE

SUBJECT CODE: EI 64

SUBJECT NAME: EMBEDDED SYSTEM

COURSE OBJECTIVE: [60Hrs]

To provide experience to integrate hardware and software for microcontroller applications systems. To acquire knowledge about microcontrollers embedded processors and their applications. Foster ability to understand the internal architecture and interfacing of different peripheral devices with Microcontrollers

UNIT-I[12Hrs]

8 Bit Micro controllers: Introduction to MCS-51 family, Peripheral of MCS-51 family, PIC Micro Controller –CPU architecture, registers, instruction sets addressing modes, loop timing, On chip Peripherals of PIC, Motorola MC68H11 Family Architecture Registers, Addressing modes, Interrupts features of interrupts- Interrupt vector and Priority, timing generation and
measurements, Input capture, Out capture.

UNIT-II[12Hrs]

16 Bit Micro controller: Introduction to MCS-96 family, Peripherals of MCS-96 family, 80196-architecture, CPU operation, memory organization, I/O port, Operand addressing, instruction set, Interrupts, On chip Peripherals-PWM, Timers, HIS/HSO, Serial Port, External memory interfacing.

UNIT-III[12Hrs]

32 bit Micro controller: Intel 80960-architecture, memory address space, Salient features of ARM processor family-ARM7 /ARM9/ ARM9E/ ARM10/ ARM11/ Secure Core /Strong ARM, XScale technology, ARM9200 Architecture,Pinouts, Peripheral Identifier, System Interrupts, External Interrupts, Product memory mapping, External memory mapping, Internal memory mapping, On chip Peripherals-Memory controllers, external Bus Interface(EBI), Advanced interrupt controller(AIC), USART, Timer counter.

UNIT-IV[12Hrs]

Software development and tools: Embedded system evolution trends. Round- Robin, Roundrobin with

Interrupts, function- One- Scheduling Architecture, Algorithms. Introduction to assembler- compiler- cross compilers and Integrated Development Environment (IDE) Object Oriented Interfacing, Recursion, Debugging strategies, Simulators.

UNIT-V[12Hrs]

Real Time Operating Systems: Task and Task States, tasks and data, semaphores and shared Data Operating system Services- Message queues- Timer Function- Events- Memory Management, Interrupt Routines in an RTOS environment, basic design Using RTOS.

COURSE OUTCOMES:

At the end of the course, students will demonstrate the ability to:

1. Suggest design approach using advanced controllers to real-life situations

REFERENCES:-

1. David E Simon, " An embedded software Primer" Pearson education Asia.
2. John B Peat man " Design with Micro controller" Pearson education Asia.
3. Jonartthan W. Valvano Brooks/cole " Embedded Micro Computer Systems. Real time interfacing", Thomson learning.

LIST OF EXPERIMENTS

1. Design and develop a reprogrammable embedded computer using 8051 microcontrollers and to show the following aspects. a. Programming b. Execution c. Debugging

2. Configure timer control registers of 8051 and develop a program to generate given time delay.

3. To demonstrate use of general purpose port i.e. Input/ output port of two controllers for data transfer between them.

4. Port I / O: Use one of the four ports of 8051 for O/P interfaced to eight LED"s. Simulate binary counter (8 bit) on LED"s

5. To interface 8 LEDs at Input-output port and create different patterns.

6. To demonstrate timer working in timer mode and blink LED without using any loop delay routine.

7. To demonstrate interfacing of seven-segment LED display and generate counting from 0 to 99 with fixed time delay.

8. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clock wise direction

9. Generate traffic signal.

10. Implement temperature control.

SEMESTER: VI

CATEGORY: OE-2

SUBJECT CODE: EI 65(A)

SUBJECT NAME: SCADA SYSTEM

COURSE OBJECTIVE: [60Hrs]

Supervisory control and data acquisition *(*SCADA*) is* a system of software and hardware elements that allows industrial organizations to Controlling & monitoring Process in real time from Remote location. Analyze & calculation of complex the Process & maintain accordingly the Control Signals.

UNIT I[12Hrs]

Introduction to SCADA and PLC:SCADA: Data acquisition system, evaluation of SCADA, communication technologies, monitoring and supervisory functions. PLC: Block diagram, programming languages, Ladder diagram, Functional Block diagram, Applications, Interfacing of PLC with SCADA.

UNIT II[12Hrs]

SCADA system components: Schemes, Remote Terminal UNIT, Intelligent Electronic Devices, Communication Network, SCADA server.

UNIT III[12Hrs]

SCADA Architecture-Various SCADA Architectures, advantages and disadvantages of each system, single unified standard architecture IEC 61850 SCADA / HMI Systems.

UNIT IV[12Hrs]

SCADA Communication-Various industrial communication technologies- wired and wireless methods and fiber optics, open standard communication protocols.

UNIT V[12Hrs]

Operation and control of interconnected power system-Automatic substation control, SCADA configuration, Energy management system, system operating states, system security, state estimation, SCADA applications Utility applications, transmission and distribution sector operation, monitoring analysis

and improvement. Industries oil gas and water. Case studies, implementation, simulation exercises.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

1. Understand the problem of system stability and its impact on the system.
2. Analyse linear dynamical systems and use of numerical integration methods.
3. Model different automation system components for the study of stability.
4. Understand the methods to improve stability.

REFERENCES:-

1. Stuart A Boyer: SCADA supervisory control and data acquisition.
2. Gordan Clark, Deem Reynders, Practical Modem SCADA Protocols.
3. Sunil S. Rao, Switchgear and Protections, Khanna Publication.

LIST OF EXPERIMENTS

1 Programmable Logic Controller Experiments

2. Water level controller using programmable logic controller

3. Batch process reactor using programmable logic controller

4. Speed control of ac servo motor using programmable logic controller

5. Lift control system using plc

6. Star delta starter using plc 32

7. Study of scada system components: remote terminal unit.

8. Study of scada system components: intelligent electronics devices.

9. Study of scada system :scada server.

10. Study of scada articheture.

SEMESTER: VI

CATEGORY: OE-2

SUBJECT CODE: EI 65(B)

SUBJECT NAME: FUZZY LOGIC & NEURAL NETWORKS

COURSE OBJECTIVE: [60Hrs]

Fuzzy logic is a branch of machine intelligence that helps computers understand the variations that occur in the uncertain. Fuzzy logic, neural networks and a method to employ them together to solve the real world problems

UNIT-I[12Hrs]

Fuzzy system introduction, Fuzzy relation, Membership function, Fuzzy matrices and entropy, Fuzzy operation and composition.

UNIT-II[12Hrs]

Fuzzy Variables, Linguistic variables, measures of fuzziness, concepts of defuzzification, Fuzzy control applications.

UNIT-III[12Hrs]

Fundamentals of Artificial Neural networks- Biological prototype – Artificial neuron, Activation functions, Single layer and multiplayer networks. Training Artificial neural networks, Preceptrons, Exclusive Or Problem – Linear seperability, Storage efficiency, Preceptron learning, perceptron training algorithms.Back propagation, Training algorithm, network configurations, Network paralysis, Local minima, temporal instability.

UNIT-IV[12Hrs]

Counter propagation networks, Kohonen layer, Training the kohonen layer, Pre processing the inputted vectors, Initialising the wright vectors, Statistical properties, Training the grosberg layer. Full counter propagation networks, Applications. Statistical methods, Boltzman training, Cauchy training, Artificial specific heat methods, Applications to general non-linear optimization problems. Back propagation and cauchy training.

UNIT-V[12Hrs]

Hopfield nets, Recurrent networks, Stability, Associative memory, Thermodynamic systems, Statistical Hopfiled networks, Applications. Bi-directional associative memories, Retrieving on stored association, Encoding the associations.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

1. Understand basic knowledge of fuzzy sets and fuzzy logic.
2. Apply basic fuzzy inference and approximate reasoning.
3. Understand principles of neural networks.
4. Apply basic fuzzy system modelling methods.

REFERENCES :

1. Laurence Fausett, “Fundamentals of Neural Networks”, Prentice Hall.
2. Zmmermann H.J., “Fuzzy Set Theory and its Applications”, Allied Publishers Ltd.
3. Klir G.J., and Folger T., “Fuzzy Sets, Uncertainty and Information”, Prentice Hall.
4. Limin Fu., “Neural Networks in Computer Intelligence”, McGraw Hill.
5. Zuroda J.M., “Introduction to Artificial Neural Systems”, Jaico Publishing.
6. Haykin S., "Artificial Neural Network: A Comprehensive Foundation: Asia Pearson Pub.

LIST OF EXPERIMENTS

1. Learning rules and activation functions in NN
2. Development of logic using MP and Hebb neuron model
3. Development of supervised learning using NN Toolbox
4. Development and testing of perceptron NN algorithm
5. Development of ADALINE algorithm with bipolar inputs and outputs
6. Development of auto associative network using outer product rule
7. Development of fuzzy membership functions and fuzzy set properties
8. Development of logic for fuzzy relations
9. Verification of logic using fuzzy relations
10. Design of a fuzzy controller systems using fuzzy tool of Matlab
11. Application development using NN/Fuzzy logic

SEMESTER: VI

CATEGORY: OE-2

SUBJECT CODE: EI 65(C)

SUBJECT NAME: NUCLEAR INSTUMENTATION

COURSE OBJECTIVE: [60Hrs]

1. To introduce the basic concept of radioactivity, properties of alpha,beta and gamma rays
2. To study various radiation detectors, detector classification
3. To study the electronics and counting systems
4. To study applications of nuclear instrumentation in medicines, Industry and in Agriculture.

UNIT-I[12Hrs]

General Introduction to Properties of Nuclear Systems and Radiation, Interaction of radiation with matter, Radioactive sources Geiger-Muller counters, Scintillation counters, Semiconductor devices, Neutron detectors bas on recoil, Measuring circuits including modulators, converters and stabilizers, Synchronous detectors. Counting Statistics, Correlation sets, Standard deviation of rate meters, Error propagation, Effect of background, Statistical distribution of pulse h efficiency.

UNIT-II[12Hrs]

Nuclear Reactor Instrumentation

Diffusion, moderation, absorption and delay processes, Neutron flux measurement, Control rod calibration, Nuclear fuel inspection and testing including poisoning, Radiation measurement, Remote control instrumentation, Nuclear instrument maintenance.

UNIT-III[12Hrs]

Application to industrial System

Radioactive Tracer technique, Gas and Liquid flow measurement, Leak detection, Residence time and its distribution, application to blending corrosion and wear studies density measurement by beta rays, Gamma of surface material by back scattering.

UNIT-IV[12Hrs]

Level detection by radioactive devices, interface Measurement of gas pressure and gas detection, a idity meter, moisture meter, smoke detection, Ozonizer, Radiochromatography and interferometry.Portable instruments, Source activity for dynamic properties of instruments.

UNIT-V[12Hrs]

Safety

Hazards of ionization radiation, physiological effect of radiation, Dose and Risk, Radiological protection (Alpha, beta and Gamma, X, Neutron), Shielding material and effectiveness. Operational safety instruments, emergency schemes, effluent disposal, Application to medical diagnosis and treatment.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

1. Students also get thorough knowledge of electronics and counting systems used in nuclear instrumentation
2. Students get detailed information about applications of nuclear instrumentation in medicine, industry etc.

REFERENCES:-

1.Ed. Noltingk, B.E., "Instrumentation Reference B

2.Heinemenn. Boltan W., Newness, "Instrumentation and

Jones, "Instrumentation Series",

LIST OF EXPERIMENTS:

1.To study preamplifiers for nuclear pulse processing.

2.To study pulse shaping circuit for nuclear pulse processing

3.To study discriminators for nuclear pulse processing

4.Study of GM Counter PulsesPurpose:

5.Study of the V-I characteristics of a GM Counting System.Purpose: To study the variations of count rate with applied voltage and thereby determine the plateau region, operting voltage and slope of plateau.

6.To study the Gamma Ray Spectrometer based on SCA.Purpose: The purpose is to understand the functioningand working of Spectrometer.

7.To obtain the spectrum of Gamma emitting isotope Cs 137 by using scintillator spectrometer.

8.To obtain the spectrum of Gamma emitting isotope Co 60 by using scintillator spectrometer.

9.To study the energy calibration of Spectrometer and analysis of the energy of unknown Gamma source.

SEMESTER: VI

CATEGORY: PROJECT

SUBJECT CODE: EI 66

SUBJECT NAME: MINI PROJECTS/ELECTRONIC DESIGN WORKSHOP

COURSE OBJECTIVE: [60Hrs]

Mini Project helps you to explore and strengthen the understanding of fundamentals through practical application of theoretical concepts. Mini Project can help you to boost your skills and widen your horizon of thinking. It acts like a beginners guide to do larger projects later in their career.

GUIDELINES:

1. The mini-project is a team activity having 3-4 students in a team. This is electronic product design work with a focus on electronic circuit design.

2. The mini project may be a complete hardware or a combination of hardware and software. The software part in mini project should be less than 50% of the total work.

3. Mini Project should cater to a small system required in laboratory or real life.

4. It should encompass components, devices, analog or digital ICs, micro controller with which functional familiarity is introduced.

5. After interactions with course coordinator and based on comprehensive literature survey/ need analysis, the student shall identify the title and define the aim and objectives of miniproject.

6. Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and submit the proposal within first week of the semester.

7. The student is expected to exert on design, development and testing of the proposed work as per the schedule.

8. Art work and Layout should be made using CAD based PCB simulation software. Due considerations should be given for power requirement of the system, mechanical aspects for enclosure and control panel design.

9.Completed mini project and documentation in the form of mini project report is to be submitted at the end of semester.

10. The tutorial sessions should be used for discussion on standard practices used for electronic circuits/product design, converting the circuit design into a complete electronic product, PCB design using suitable simulation software, estimation of power budget analysis of the product, front panel design and mechanical aspects of the product, and guidelines for documentation /report writing.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

1. Students will be able to practice acquired knowledge within the chosen area of technology for project development.
2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach

SEMESTER: VI

CATEGORY: PDFS

SUBJECT CODE: BE 61

SUBJECT NAME: PROFESSIONAL DEVELOPMENT FINISHING SCHOOL

(LEVEL-IV)

TOTAL - 36 HOURS

COURSE OBJECTIVE

The students are to be groomed with respect to personality development. Emphasis to be made in reading, writing and vocal English, quantitative aptitude and logical reasoning to be stressed.

UNIT-I(18 HOURS)

Final Finishing:

Final Preparation of CV. Final Compilation of Database of Students with Necessary Mapping, Mock Interviews, Group Discussions.

UNIT-II(18 HOURS)

Aptitude / Reasoning: Quantitative Aptitude and Logical Reasoning- Level IV Problem solving on. Ratio and Proportions, Solutions and Mixtures, Sets, Simple Interest and Compound Interest, Simple and Quadratic Equations.

Course Outcome

Attainment of confidence the students to be able to face interviews, group discussion and presentation ability. Knowledge on basic mathematical ability attained. Hence forth a student become competent to face the challenges of the world after attainments of knowledge at college level

OFFERING NCC A GENERAL GENERIC ELECTIVE CREDIT COURSE IN UNIVERSITIES UNDER CHOICE BASED CREDIT SYSTEM TO ALIGN WITH NEW EDUCATION POLICY 2020

CONTENTS

SECTIONI:NCC CREDIT COURSE DESIGN DOCOMENT

UNDER CHOICE BASED CREDIT SYSTEM AS GENERAL ELECTIVE FOR SENIOR DIVISION / SENIOR WING

9. **Preamble**. The National Cadet Corps (NCC) is governed by NCC Act 1948 and attendant NCC Rules. It functions under the Ministry of Defence and is headed by DGNCC. It is organised into 17 State Directorates each headed by an Additional/Deputy Director General. The aims of NCC are:-

   (a) To develop character, camaraderie, discipline, secular outlook, the spirit of adventure, sportsman spirit and ideals of selfless service amongst cadets by working in teams, honing qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.

   (b) To create a pool of organized, trained and motivated youth with leadership qualities in all walks of life, who will serve the Nation regard less of which career they choose.

   (c) To provide a conducive environment to motivate young Indians to choose the Armed Forces as a career.

10. **Purpose.** Currently NCC training is imparted as extra-curricular activity to volunteer students from recognized schools and colleges who enroll as cadets. NCC as a Credit Course is designed with an intent to transform NCC training into a curricular activity from an extra-curricular thereby providing academic credits to students undergoing NCC training along with other attended advantages to the cadets in the college/ university.

11. **Introduction to NCC Credit Course Design.** Institutional Training is the mainstay of NCC training and it is conducted at colleges and universities by Associate NCC Officers and Armed Forces personnel. The application of knowledge gained through institutional training is further honed or developed to a higher degree in NCC Camps. The Institutional Training syllabus comprises Common Subjects and Specialised Subjects (military component). NCC Credit Course is designed to offer Institutional Training of

330

Senior Wing /Division is over six semesters (three years), comprising 300 periods (excluding Camp), of which 120 periods are meant for theory with 108 credits and 180 periods for practical with 6 credits. Each period is counted as hour. The ratio between theory and practical in terms of number of hours of training is 5:6, but in terms of credits is 5:3, since as per CBCS two hours of practical is counted towards one period of training as against one hour for theory. In addition two separate courses have been

150

designed for two Camps normally referred to as Annual Training Camps (ATC).

Training schedules planned for cadets ensure that the optimum benefits of the NCC organization reach maximum number of cadets. The main emphasis is on practical training which in consonance with theory is made to facilitate active participation of learner, better assimilation of knowledge, and proper development of various skills, strengthening of mind and body which is the bedrock of NCC training.

NCC GENERAL ELECTIVE CREDIT COURSE DESIGN SUMMARY					
Semester	**Credits Allocated**			**Total**	**Remarks**
	Theory	**Practical**	**Camp**		
Semester - I	**01**	**01**	**-**	**02**	
Semester - II	**01**	**01**	**-**	**02**	
Semester – III	**01**	**01**	**05**	**07**	**Credits of 1st Camp merged with 3rd Sem**
Semester – IV	**02**	**01**	**-**	**03**	
Semester – V	**01**	**01**	**05**	**07**	**Credits of 2nd Camp merged with 5th Sem**
Semester - VI	**02**	**01**	**-**	**03**	
Total	**08**	**06**	**10**	**24**	**Twenty-Four Credits**

INSTITUTIONAL TRG SYLLABUS

COMMON SUBJECTS				
Ser	Subject	Periods (1 hour duration each)		Total
		Lectures/Tutorials	Practicals	
1	NCC General	06	-	06
2	National Integration	04		04
3	Drill	-	45	45
4	Weapon Training	-	25	25
5	Personality Development	25		25
6	Leadership	12	-	12
7	Disaster Management	13		13
8	Social Service & Community Development	08	39	47
9	Health & Hygiene	-	10	10
10	Adventure	01		01
11	Environmental awareness & conservation	03		03
12	Obstacle Training	-	09	09
13	General Awareness	04		04
14	Border & Coastal Areas	06		06
TOTAL HOURS COMMON SUBJECTS(a)		82	128	210

SPECIALSED SUBJECTS (ARMY)				
Ser	Subject	Periods (1 hour duration each)		Total
		Lectures/Tutorials	Practical	
1	Armed Forces	09	-	09
2	Map Reading	-	24	24
3	Communications	03	03	06
4	Infantry Weapons	03	03	06

5	**Field Craft & Battle Craft**		**22**	**22**
6	**Military History**	**23**	**-**	**23**
Total Hours		**38**	**52**	**90**

SPECIALSED SUBJECTS (NAVY)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**Naval Orientation**	**12**	**-**	**12**
2	**Naval Communication**	**02**	**18**	**20**
3	**Navigation**	**02**	**03**	**05**
4	**Seamanship**	**15**	**18**	**33**
5	**Fire Fighting and Damage Control**	**04**	**03**	**07**
6	**Ship and Boat Modelling**	**03**	**10**	**13**
Total hours		**38**	**52**	**90**

SPECIALISED SUBJECTS (AIR FORCE)				
Ser	**Subject**	**Periods (1 hour duration each)**		**Total**
		Lectures/Tutorials	**Practicals**	
1	**General Service Knowledge**	**08**	**-**	**08**
2	**Air Campaign**	**06**	**02**	**08**
3	**Principles of flight**	**06**	**06**	**12**
4	**Airmanship**	**01**	**07**	**08**
5	**Navigation**	**05**	**-**	**05**
6	**Aeroengines**	**06**	**-**	**06**
7	**Basic flight Instruments**	**03**	**03**	**06**

8	**Aero modelling**	**03**	**34**	**37**
Total Hours		**38**	**52**	**90**

INSTITUTIONAL TRAINING: TOTAL HOURS & CREDITS

INSTITUTIONAL TRAINING: TOTAL HOURS & CREDITS			
ITEM	Periods (1 hour duration each)		Total
	Lectures/Tutorials	Practicals	
TOTAL HOURS COMMON SUBJECTS	82	128	210
TOTAL HOURS SPECIALISED SUBJECTS(ARMY/NAVY/AIR FORCE)	38	52	90
TOTAL HOURS INSTITUTIONAL TRAINING	120	180	300
TOTAL CREDITS INSTITUTIONAL TRAINING	08 CREDITS (15 HOUR THEORY = 1 CREDIT POINT)	6 CREDITS (30 HOURS PRACTICAL TRAINING = 1 CREDIT POINT)	

NCC CAMP TRAINING SYLLABUS

COMMON SUBJECTS				
S No.	**Subjects**	**Periods**		**Total**
		L/T	**P**	
1.	Physical Training	-	18	18
2.	Drill	-	32	32
3.	Weapon Training	08	28	36
4.	National Integration and Awareness	08	-	08
5.	Personality Development	08	12	20
6.	Leadership	08	-	08
7.	Disaster Management	08	-	08
8. .	Social Service and Community Development	-	08	08
9.	Health & Hygiene	08	-	08
10.	Obstacle Training	-	04	04
11.	Military History	04	-	04
12.	Communication	04	-	04
13.	Games	-	18	18
14.	Culture	-	18	18
	TOTAL	**56**	**138**	**194**
SPECIALISED SUBJECTS				
1.	Map Reading	-	24	24
2.	Infantry Weapons	04	02	06
3.	Field Craft & Battle Craft	-	16	16
	TOTAL	**04**	**42**	**46**
	GRAND TOTAL	**60 (4 credit)**	**180 (6 credit)**	**240 (10 credit)**

NCC CAMP TRAINING SYLLABUS (FOR THEORY)

Ser No	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Weapon Training	-	-	04	-	04	-	08
2.	National Integration & Awareness	-	-	04	-	04	-	08
3.	Personality Development	-	-	04	-	04	-	08
4.	Leadership	-	-	04	-	04	-	08
5.	Disaster Management	-	-	04	-	04	-	08
6.	Health & Hygiene	-	-	04	-	04	-	08
7.	Military History			02		02		04
8.	Communication			02		02		04
9.	Infantry Weapons	-	-	02	-	02	-	04
	TOTAL	-	-	30	-	30	-	60
	TOTAL Credit	-	-	2	-	2	-	4

NCC CAMP TRAINING SYLLABUS (FOR PRACTICAL)

Ser No	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Physical Training	-	-	09	-	09	-	18
2.	Drill	-	-	16	-	16	-	32
3.	Weapon Training	-	-	14	-	14	-	28
4.	Personality Development	-	-	06	-	06	-	12
5.	Social Service and Community Development	-	-	04	-	04	-	08
6.	Obstacle Training	-	-	02	-	02	-	04
7.	Games			09		09		18
8.	Culture			09		09		18
9.	Map Reading	-	-	12	-	12	-	224
10.	Infantry Weapons	-	-	01	-	01	-	02
11.	Field Craft & Battle Craft	-	-	08	-	08	-	16
	TOTAL			**90**		**90**		**180**

	TOTAL CREDIT			**03**		**03**		**06**

SEMESTER WISE COURSE DESIGN ARMY CADETS

INSTITUTIONAL TRAINING: SEMESTER WISE DISTRIBUTION OF NCC SYLLABUS FOR THEORY(ARMY CADETS)

S. NO.	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	NCC General	06	-	-	-	-	-	06
2.	National Integration	04	-	-	-	-	-	04
3.	Personality Development	02	05	05	04	06	04	25
4.	Leadership	-	05	04	03	-	-	12
5.	Disaster Management	-	-	03	10	-	-	13
6.	Social Service & Community Development	03	05	-	-	-	-	08
7.	Adventure	-	-	01	-	-		01
8.	Environmental Awareness & Conservation	-	-	-	03	-		03
9.	General Awareness	-	-	-	04	-		04
10.	Border & Coastal Areas	-	-	02	-	02	02	06
11.	Armed Forces	-	-	-	06	-	03	09
12.	Infantry Weapons	-	-	-	-	3	-	3
13.	Communication	-	-	-	-	-	03	03
14.	Military Hospital	-	-	-	-	04	19	23
	TOTAL	15	15	15	30	15	30	120
	TOTAL Credit	1	1	1	2	1	2	08

INSTITUTIONAL TRAINING: SEMESTER WISE DISTRIBUTION OF NCC SYLLABUS FOR PRACTICAL (ARMY CADETS)

S. NO.	SUBJECT	I	II	III	IV	V	VI	TOTAL
1.	Drill	12	12	08	07	03	03	45
2.	Field Craft & Battle Craft	03	04	04	04	04	03	22
3.	Map Reading	03	05	04	04	04	04	24
4.	Weapons Training	05	04	04	04	04	04	25
5.	Communication	-	-	-	-	-	03	03
6.	Infantry Weapons	-	-	-	-	-	03	03
7.	Social Service & Community Development	07	05	05	06	06	10	39
8.	Health & Hygiene	-	-	-	05	05	-	10
9.	Operation Training	-	-	05	-	04		09
	TOTAL	30	30	30	30	30	30	180
	TOTAL Credit	01	01	01	01	01	01	06

INSTITUTIONAL TRAINING: SEMESTER WISE THEORY DETAILED SYLLABUS (ARMY CADETS)

SEMESTER I

S.No	Subject	Periods	Chapter	Lesson	Hours
1	NCC General	6	NCC-I	Aims, Objectives and Org of NCC	1
			NCC-II	Incentives	2
			NCC-III	Duties of NCC Cadets	1
			NCC-IV	NCC Camps: Types and Conduct	2
2	National Integration and Awareness	4	NI-I	National Integration: Importance and Necessity	1
			NI-II	Factors affecting National Integration	1
			NI-III	Unity in Diversity	1
			NI-IV	Threats to National Security	1
3	Personality Development	2	PD - I	Factors Self-Awareness Empathy Critical and Creative Thinking Decision Making and Problem Solving	2
4	Social Service and Community Development	3	SSCD - I	Basics of Social Service Rural Development Programmes NGO's Contribution of Youth	3
				TOTAL HOURS	**15**
				TOTAL CREDITS	**1**

SEMESTER II

S.No	Subject	Periods	Chapter	Lesson	Hours
5	Personality Development	5	PD-II	Communication Skills	3
			PD-III	Group Discussion -Coping with Stress and Emotions	2
6	Leadership	5	L-I	Leadership Capsule Traits Indicators Motivation Moral Values Honour Code	3
			L-II	Case Studies Shivaji, Jhansi Ki Rani,	2
7	Social Service and Community Development	5	SS-IV	Protection of Children & Women Safety	1
			SS-V	Road/Rail Travel Safety	1
			SS-VI	New Initiatives	2
			SS-VII	Cyber and Mobile Security Awareness	1
				TOTAL HOURS	**15**
				TOTAL CREDITS	**1**

SEMESTER III					
S.No	Subject	hours	Chapter	Lesson	HOURS
8	Personality Development	5	PD-III	Group Discussions - Change your Mindset	2
			PD-V	Public Speaking	3
9	Leadership	4	L-II	Case Studies – APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy	4
10	Disaster Management	3	DM-I	Disaster Management Capsule Organisation Types of Disasters Essential Services Assistance Civil Defence Organisation	3
11	Adventure	1	AD-I	Adventure activities	1
12	Border & Coastal Areas	2	BCA-I	History, Geography & Topography of Border/ Coastal Areas	2
TOTAL HOURS					**15**
TOTAL CREDITS					**1**

SEMESTER IV					
S.No	Subject	hours	Chapter	Lesson	HOURS
13	Personality Development	4	PD-III	Group Discussions - Time Management, Social Skills	4
14	Leadership	3	L-II	Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war	3
15	Disaster Management	9	DM-II	Initiative Trg, Organising Skills, Dos and Don'ts Natural Disasters Man Made Disasters	9
		1	DM-III	Fire Services and Fire Fighting	1
16	Environmental Awareness	3	EA-I	Environmental Awareness and Conservation	3
17	General Awareness	4	GA-I	General Awareness	4
18	Armed Forces	6	AF-1	Army, Navy, Air Force and Central Armed Police Forces	6
TOTAL HOURS					30
TOTAL CREDITS					2

SEMESTER V					
S.No	Subject	hours	Chapter	Lesson	HOURS
19	Personality Development	6	PD-III	Group Discussions - Team Work	2
			PD-V	Public Speaking	4
20	Border & Coastal Areas	2	BCA-II	Security Setup and Border/Coastal management in the area	2
21	Introduction to Infantry Battalion and its Equipments	3	INF-1	Organisation of Infantry Battalion & its weapons	3
22	Military History	4	MH-3	Study of Battles of Indo-Pak Wars 1965 & 1971	4
TOTAL HOURS					15
TOTAL CREDITS					1

SEMESTER VI					
S.No	Subject	hours	Chapter	Lesson	HOURS
25	Personality Development	3	PD-IV	Career Counselling, SSB Procedure and Interview Skills	3
27	Border & Coastal Areas	2	BCA-III	Security Challenges & Role of cadets in Border management	2
28	Armed Forces	3	AF-2	Modes of Entry into Army, Police and CAPF	3
29	Military History	19	MH-1	Biographies of Renowned Generals	6
			MH-2	War Heroes : Param Veer Chakra Awardees	3
			MH-3	Study of Battles of Kargil	2
			MH-4	War Movies	8
30	Communication	3	C-1	Introduction to Communication & Latest Trends	3
TOTAL HOURS					30
TOTAL CREDITS					2

SIX SEMESTER NCC COURSE SYLLABUS

Training Objectives: Institutional Training

145. Institutional training includes basic military training of the cadets as part of the curriculum with its long-standing effort to mould young volunteers into disciplined and responsible citizens of India. NCC course is aimed to achieve following learning objectives:-

(a) Develop character, camaraderie, discipline, secular outlook, the spirit of adventure, sportsman spirit and ideals of selfless service amongst cadets by working in teams, honing qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.

(b) To create interest in cadets by including and laying emphasis on those aspects of Institutional Training which attract young cadets into the NCC and provides them an element of thrill and excitement.

(c) To inculcate defence Services work ethos that is characterized by hard work, sincerity of purpose, honesty, ideal of selfless service, dignity of labour, secular outlook, comradeship, spirit of adventure and sportsmanship.

(d) To create a pool of organized, trained and motivated youth with leadership qualities in all walks of life, who will serve the Nation regardless of which career they choose.

(e) To provide conducive environment to motivate young Indians to choose the Armed Forces as a career.

SEMESTER I COURSE MODULE : NATIONAL CADET CORPS I

National Cadet Corps : Course Details			
Course Title: National Cadet Corps I			
Course Code	**BNCC01GE03**	**Credits**	**1(Thr)+ 1(Pr) = 03**
L /T + P	**15+30**	**Course Duration**	**1 Semester**
Semester	**I (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e, 25% internal assessment and 75% end term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

146. **Course Objectives:** Cadets will be able to: -

(a) Know about the history of NCC, its organization, and incentives of NCC for their career prospects.

(b) Acquire knowledge of duties and conduct of ncc cadets.

(c) Understand about different NCC camps and their conducts.

(d) Understand the concept of national integration and its importance.

(e) Understand the concept of self-awareness and emotional intelligence.

(f) Understand the concept of critical & creative thinking.

(g) Understand the process of decision making & problem solving.

(h) Understand the concept of team and its functioning.

(i) Understand the concept and importance of Social service.

147. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Imbibe the conduct of NCC cadets.

(b) Respect the diversity of different Indian culture.

(c) Practice togetherness and empathy in all walks of their life.

(d) Do their own self analysis and will workout to overcome their weakness for better performance in all aspects of life.

(e) Understand creative thinking & its components.

(f) Think divergently and will try to break functional fixedness.

(g) Make a team and will work together for achieving the common goals.

(h) Do the social services on different occasions.

148. Course Content Part (I) Theory

(a) **Unit 1- NCC General (N) (Contact Hrs. 06)**. Introduction of NCC, History, Aims, Objective of NCC & NCC as Organization, Incentives of NCC, Duties of NCC Cadet. NCC Camps: Types & Conduct.

(b) **Unit 2-National Integration & Awareness (NI) (Contact Hrs. 04)** . National Integration: Importance & Necessity, Factors Affecting National Integration, Unity in Diversity & Role of NCC in Nation Building, Threats to National Security.

(c) **Unit 3- Personality Development (Contact Hrs. 3)**. Intra & Interpersonal skills - Self-Awareness-&Analysis, Empathy, Critical & creative thinking, Decision making and problem solving.

(d) **Unit 4- Social Service and Community Development(Contact Hrs. 02)**. Basics of social service and its need, Types of social service activities, Objectives of rural development programs and its importance, NGO's and their contribution in social welfare, contribution of youth and NCC in Social welfare.

Course Content Part (II) Practical

149. **Course Objectives:** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of foot drill.

(c) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(d) Develop awareness about different types of terrain and how it is used in battle craft.

(e) Develop the concept of various markings on the map and how they are co-related to the ground features.

(f) Understand the various social issues and their impact on social life.

(g) Develop the sense of self-less social service for better social & community life.

150. **Expected Learning Outcomes:** After completing this course, the cadets will be able to: -

(a) Perform foot drill and follow the different word of command.

(b) Fire a weapon effectively with fair degree of marksmanship.

(c) Undertake point to point navigation and take part in route marches by day and night.

(d) Perform the social services on various occasions for better community & social life.

151. Course Content Part (II) Practical

(a) **Unit 1. Drill (Contact Hrs. 12)**. Foot Drill- Drill ki Aam Hidayaten, Word ki Command, Savdhan, Vishram, Aram Se, Murdna, Kadvar Sizing, Teen Line Banana, Khuli Line, Nikat Line, Khade Khade Salute Karna Parade Par, Visarjan, Line Tod, Tej Chal, Tham aur Dhire Chal, Tham.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 05)**. Introduction & Characteristics of .22 rifle, Handling of .22 rifle.

(c) **Unit 3. Map Reading (MR) (Contact Hrs. 03)**. Definition of Map, Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Magnetic Variation and Grid Convergence.

(d) **Unit 4. Field Craft & Battle Craft (FC & BC) (Contact Hrs. 03)**. Introduction of Field Craft & Battle craft, Judging Distance, Method of Judging Distance.

(e) **Unit 5. Social Service and Community Development (SSCD)(Contact Hrs.07)**.Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc.

SEMESTER II COURSE MODULE : NATIONAL CADET CORPS II

Course Title: National Cadet Corps II			
Course Code	**BNCC02GE03**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15+30**	**Course Duration**	**1 Semester**
Semester	**II (Even)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

152. **Course Objectives:** Cadets will be able to: -

(a) Understand the thinking & reasoning process.

(b) Understand the process to cope with Stress & emotions.

(c) Understand the importance of improving communication skills.

(d) Identify the leadership traits.

(e) Admire the qualities of great leaders.

(f) Know about different legal provisions for children & women safety and protection.

(g) Understand the various rules & measures to be taken to ensure Road/Rail safety.

(h) Understand & spread awareness about latest Government initiatives for welfare of citizens and contribute towards Nation building.

(i) Understand concepts of cyber and mobile security.

153. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Define thinking, reasoning, critical thinking and creative thinking.

(b) To think critically about different life related issues.

(c) Think divergently and will try to break functional fixedness.

(d) Creatively in their real-life problems.

(e) Understand the organizations related to disaster management and theirfunctioning.

(f) Appreciate the role of NCC cadets in disaster management.

154. Course Content Part (I) Theory

(a) Unit 1. Personality Development (Contact Hrs.5)

(i) Thinking- Meaning and Concept of thinking, Reasoning, Process of thinking.

(ii) Critical Thinking- Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking.

(iii) Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.

(b) Unit 2. Leadership Development (Contact Hrs.5)

(i) Leadership capsule.

(ii) Important Leadership traits, Indicators of leadership and evaluation.

(iii) Motivation- Meaning & concept, Types of motivation. Factors affecting motivation.

(iv) Ethics and Honor codes.

(c) Unit 3. Social Service and Community Development (Contact Hrs. 5)

(i) Protection of Children & Women Safety.

(ii) Road/Rail Safety.

(iii) New Government Initiatives.

(iv) Cyber and mobile Security Awareness.

Course Content Part (II) Practical

155. **Course Objectives**. Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of foot drill.

(c) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(d) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

156. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Perform foot drill gracefully.

(b) Give and follow the different word of command.

(c) Fire a weapon effectively with fair degree of marksmanship.

(d) Use of bearing and service protractor and locate the places and objects on the ground.

(e) Do the social service and feel connected with social problems.

157. Course Content Part (II) Practical

(a) Unit 1. Drill (Contact Hrs. 12)

(i) Foot Drill Dahine, Baen, Aageaur Piche Kadam Lena.

(ii) Tej Chal se Murdna, Tej Chal se Salute Karna, Tej Kadam Taal aur Tham, Tej Kadam Taal se Kadam Badalna.

(iii) Teeno Teen se Ek File aur ek file se Teeno Teen Banana

(b) Unit 2.Weapon Training(Contact Hrs. 04)

(i) Range procedure & Theory of group.

(ii) Short Range firing.

(c) Unit 3. Map Reading(Contact Hrs. 05)

(i) Protractor Bearing and its conversion methods.

(ii) Service protractor and its uses.

(iii) Prismatic compass and its uses and GPS.

(iv) Navigation by compass and GPS.

(d) **Unit 4. Field Craft & Battle Craft (Contact Hrs. 04)**

(i) Indications of landmarks and Targets.

(ii) Intro, Definitions, Types of Ground, Indication of Landmarks, Methods of iden of targets, difficult targets.

(e) **Unit 5.Social Service and Community Development(Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and state level.

SEMESTER III COURSE MODULE : NATIONAL CADET CORPS III

COURSE TITLE: NATIONAL CADET CORPS III			
Course Code	**BNCC03GE02**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15 +30**	**Course Duration**	**1 Semester**
Semester	**III (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

158. **Course Objectives**. Cadets will be able to: -

(a) Understand the life history and leadership qualities of great leaders, sportspersons & entrepreneurs.

(b) Understand the various aspects of types of mindset.

(c) Understand public speaking methods &qualities.

(d) Understand the organizations related to disaster management and their functioning.

(e) Understand the role of NCC cadets in disaster management.

(f) Understand the various types of adventure activities.

(g) Understand the History, Geography & Topography of Border/ Coastal Areas.

159. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Admire and get inspired from the accomplishments of leaders from various walks of life.

(b) Develop public speaking skills.

(c) Understand the importance of positive mindset and optimistic attitude in life.

(d) Appreciate the need & requirement for disaster management and his role in disaster management activities.

(e) Know the history & geographical peculiarity of our borders & coastal regions.

Course Content Part (I) Theory

(f) Unit 1. Personality Development (Contact Hrs.5)

(i) Group Discussions - Change your Mindset

(ii) Public Speaking.

(g) **Unit 2. Leadership Development (Contact Hrs.4)**.Case Studies– APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy.

(h) Unit 3. Disaster management(Contact Hrs. 3)

(i) Disaster Management Capsule.

(ii) Organisation.

(iii) Types of Disasters.

(iv) Essential Services.

(v) Assistance.

(vi) Civil Defence Organisation.

(i) **Adventure (Contact Hrs. 1)**.Adventure activities.

(j) **Border & Coastal Areas(Contact Hrs. 2)**. History, Geography & Topography of Border/ Coastal Areas.

Course Content Part (II) Practical

160. **Course Objectives**. Cadets will be able to : -

(a) Understand that drill as the foundation for discipline and to command a group for common goal

(b) Appreciate grace and dignity in the performance of arm drill

(c) Understand the concept and importance of social service.

(d) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(e) Actively participate in social service and community development activities.

161. **Expected Learning Outcomes**.After completing this course, the cadets will be able to: -

(a) Perform arm drill gracefully.

(b) Give and follow the different word of command.

(c) Fire a weapon effectively with fair degree of marksmanship.

(d) Different positioning for fire and aiming.

(e) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(f) Observe surroundings in better way.

(g) Develop the qualities of patience and confidence and become better individuals.

(h) Will develop physical as well as mental fitness.

162. Course Content Part (II) Practical

(a) Unit 1. Drill(Contact Hrs. 08)

(i) Arm Drill.

(ii) Rifle ke saath Savdhan, Vishram aur Aram se.

(iii) Rifle ke saath Parade Par aur Saj, Rifle ke saath Visarjan, Line Tod.

(iv) Bhumi Shastra aur Uthao Shastra, Bagal Shastra aur Baju Shastra.

(b) **Unit 2. Weapon Training(Contact Hrs. 04)**. Short Range firing.

(c) **Unit 3. Map Reading (Contact Hrs. 04)**.

(i) Setting of Map.

(ii) Findings North and Own Position.

(d) Unit 4. Field Craft & Battle Craft (Contact Hrs. 04)

(i) Observation.

(ii) Camouflage.

(iii) Concealment.

(e) **Unit 5. Social Service and Community Development (Contact Hrs. 05)**. Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) Unit 6. Obstacle Training(Contact Hrs. 05)

(i) Obstacle training - Introduction, Safety-measures, Benefits.

(ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall.

SEMESTER IV COURSE MODULE : NATIONAL CADET CORPS IV

Course Title: National Cadet Corps IV			
Course Code	BNCC04GE03	Credits	2(Thr)+ 1(Pr)=03
L /T + P	30+30	Course Duration	1 Semester
Semester	IV (Even)	Contact Hours	30(Thr)+30(Pr)=60Hours
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

163. **Course Objectives**. Cadets will be able to: -

(a) Develop a sense of time management and social skills.

(b) Understand the life history & leadership qualities of personalities who have contributed in Nation Building and Literature.

(c) Understand the role of NCC cadets as 2nd line Defence in 1965 War.

(d) Develop awareness about various types of Natural and manmade disasters.

(e) Know about life saving tips during disasters.

(f) acquainted about Fire Services.

(g) Understand importance of Environmental Awareness & conservation.

(m) Understand importance of General Awareness.

(n) Know about Armed Forces.

(e) **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(i) Effectively Manage time.

(ii) Develop the qualities of social skills.

(iii) Imbibe leadership qualities.

(iv) Do group discussions effectively.

(v) Be motivated to serve the nation by joining Armed forces.

(vi) Contribute in environmental awareness and conservation activities.

(vii) Keep abreast of current affairs & general awareness. (viii)Effectively contribute in managing disaster relief tasks.

164. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.4)**. Group Discussions – Social Skills & Time management.

(b) **Unit 2. Leadership Development (Contact Hrs.3)**.Case Studies – Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war.

(c) Unit 3. Disaster management(Contact Hrs. 10)

(i) Initiative Trg, Organising Skills.

(ii) Dos and Don'ts.

(iii) Natural Disasters.

(iv) Man Made Disasters.

(v) Fire Services and Fire Fighting.

(d) **Environmental Awareness (Contact Hrs. 3)**. Adventure Environmental Awareness and Conservation.

(e) **General Awareness (Contact Hrs. 4)**. General Awareness.

(f) **Armed Forces(Contact Hrs. 6)**.Army, Navy, Air Force and Central Armed Police Forces.

Course Content Part (II) Practical

165. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Understand various signals to convey messages in the army.

(c) Get acquainted various section formations.

(d) Understand the basics of personal and public hygiene.

(e) Get acquainted with the procedure to treat the wounds and fractures during emergencies.

166. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform weapon drill gracefully.

(b) Give and follow the different word of command.

(c) Appreciate grace and dignity in the performance of foot drill.

(d) Apply signals in there day to day functioning.

(e) Provide first aid during the emergencies.

(f) Navigate to the given location on ground using compass and GPS.

(g) Practice healthy practices for the personal sanitation and hygiene.

167. Course Content Part (II) Practical

(a) Unit 1. Drill (Contact Hrs. 08)

(i) Arm Drill.

(ii) Salami Shastra.

(iii) Squad Drill with Arms.

(b) **Unit 2. Weapon Training (Contact Hrs. 04)**. Short Range firing

(c) Unit 3. Map Reading(Contact Hrs. 04)

(i) Map to Ground.

(ii) Ground to Map.

(d) Unit 4. Field Craft & Battle Craft(Contact Hrs. 04)

(i) Fire and Move Capsule.

(ii) Field signal- with hand, with Weapons, Signal with Whistle.

(iii) Field signals as means of giving orders.

(iv) Field signals by day, Field signals by night.

(v) Section Formation.

(e) **Unit 5. Social Service and Community Development(Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) Unit 6. Health &Hygiene(Contact Hrs. 05)

(i) Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene).

(ii) First Aid in common medical emergencies.

(iii) Treatment & Care of Wounds.

SEMESTER V COURSE MODULE : NATIONAL CADET CORPS V

Course Title: National Cadet Corps V			
Course Code	**BNCC05GE02**	**Credits**	**1(Thr)+ 1(Pr)=02**
L /T + P	**15 +30**	**Course Duration**	**1 Semester**
Semester	**V (Odd)**	**Contact Hours**	**15(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

168. **Course Objectives**. Cadets will be able to: -

(a) Understand the concept of Team and its functioning.

(b) Hone Public speaking skills.

(c) Understand the security set up amd management of Border/Coastal areas.

(d) Acquire knowledge about an Infantry Battalion organisation and its weapons.

(e) Acquire knowledge about Indo-Pak Wars fought in 1965 & 1971.

169. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Participate in team building exercise and value team work.

(b) Improve communication skills by public speaking activities.

(c) Understand the security mechanism and management of Border/Coastal areas.

(d) Get motivated to join armed forces.

170. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.6)**.

(i) Group Discussions –Team work.

(ii) Public speaking.

(b) **Unit 2. Border & Coastal Areas(Contact Hrs.2)**. Security Setup and Border/Coastal management in the area.

(c) **Unit 3. Introduction to Infantry Battalion and its Equipment(Contact Hrs. 3)**.

Organisation of Infantry Battalion & its weapons

(d) **Military History(Contact Hrs. 4)**. Study of Battles of Indo-Pak Wars 1965 & 1971.

Course Content Part (II) Practical

171. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of ceremonial drill.

(c) Use the compass and GPS to locate places on the ground and map.

172. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform ceremonial drill and follow the different word of command.

(b) Do the social service on various occasions and get connected with the community.

(c) Do all the asana and gain the physical& mental fitness.

173. Course Content Part (II) practical

(a) Unit 1. Drill(Contact Hrs. 03)

(i) Ceremonial Drill.

(ii) Guard Mounting.

(b) Unit 2. Field Craft & Battle Craft(Contact Hrs. 04)

(i) Fire control orders.

(ii) Types of fire control orders.

(iii) Fire and Movement- when to use fire and movements tactics, Basic considerations, Appreciation of ground cover, Types of cover, Dead ground, Common Mistakes, Map and air photography, Selection of Fire position and fire control.

(c) **Unit 3. Map Reading(Contact Hrs. 04)**.Google Maps & applications

(d) **Unit 4. Weapon Training(Contact Hrs. 04)**.Short Range firing

(e) **Unit 5. Social Service and Community Development (Contact Hrs. 05)** Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and State level.

(f) Unit 6. Health & Hygiene(Contact Hrs. 05)

(i) Yoga- Introduction, Definition, Purpose, Benefits.

(ii) Asanas-Padamsana, Siddhasana, Gyan Mudra, Surya Namaskar, Shavasana, Vajrasana, Dhanurasana, Chakrasana, Sarvaangasana, Halasana etc.

(i) Unit 7. Obstacle Training(Contact Hrs. 05)

(i) Obstacle training – Intro, Safety measures, Benefits.

(ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall etc.

SEMESTER VI COURSE MODULE : NATIONAL CADET CORPS VI

Course Title: National Cadet Corps VI			
Course Code	**BNCC06GE03**	**Credits**	**2(Thr)+ 1(Pr)=03**
L /T + P	**30 +30**	**Course Duration**	**1 Semester**
Semester	**VI (Even)**	**Contact Hours**	**30(Thr)+30(Pr)=45Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

174. **Course Objectives**. Cadets will be able to: -

(a) Get acquainted about counselling process its need and importance.

(b) Know about SSB procedure and different tasks and tests.

(c) Know about the conduction during the interview.

(d) Understand the security challenges & role of cadets in Border Areas.

(e) Know about the modes of entry in Armed forces, CAPF & police.

(f) Understand the life history & leadership qualities of great generals.

(g) Learn about 1999 Kargil war.

(h) Acquire the knowledge about various wars and their heroes.

(i) Know about various components of communication process.

175. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Get motivated to join Armed forces, police & CAPF.

(b) Write their CV effective and appealing.

(c) Face SSB interview effectively in their future.

(d) Understand individaul responsibilities & role in meetings the security challenges on Border/Coastal areas.

(e) Imbibe the feeling of patriotism.

(f) Communicate more effectively.

176. Course Content Part (I) Theory

(a) **Unit 1. Personality Development (Contact Hrs.3)**.

(i) Career Counselling.

(ii) SSB Procedure.

(iii) Interview Skills.

(b) **Unit 2. Border & Coastal Areas(Contact Hrs.2)**. Security Challenges & Role of cadets in Border management.

(c) **Unit 3. Armed Forces(Contact Hrs. 3)**. Modes of Entry into Army, Police and CAPF.

(d) **Military History(Contact Hrs. 19)**.

(i) Biographies of Renowned Generals.

(ii) War Heroes : Param Veer Chakra Awardees.

(iii) Study of Battles of Kargil.

(iv) War Movies.

(e) **Communication(Contact Hrs. 3)**.Introduction to Communication & Latest Trends.

Course Content Part (II) Practical

177. **Course Objectives.** Cadets will be able to: -

(a) Understand that drill as the foundation for discipline and to command a group for common goal.

(b) Appreciate grace and dignity in the performance of ceremonial drill.

(c) Know about various knots and lashing used in soldiering.

(d) Acquire awareness about the basic weapon system in use in the Armed Forces.

178. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Perform foot drill and follow the different word of command.

(b) Aiming range and figure targets.

(c) Use the different knots and lashing in day-to-day life for different purposes.

(d) Develop the feeling of altruism.

179. **Course Content Part (II) Practical**.

(a) **Unit 1. Drill (Contact Hrs. 03)**.

(i) Ceremonial Drill.

(ii) Guard of Honour.

(b) **Unit 2. Weapon Training(WT) (Contact Hrs. 04)**.Short Range firing.

(c) **Unit 3. Map Reading(MR) (Contact Hrs. 04)**. Google maps and Applications.

(d) **Unit 4. Field Craft & Battle Craft(FCBC) (Contact Hrs. 03)**. Knots, Lashing and Stretchers.

(e) **Unit 5. Social Service and Community Development(SSCD) (Contact Hrs. 05)**. Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.

(f) **Unit 6 Introduction of Infantry Weapons &Equipment(INF) (Contact Hrs.03)**. Characteristics of 5.56MM INSAS Rifle, Ammunition, Fire Power, Stripping, Assembling & Cleaning Practice.

(g) Unit 7. Communication (COM) (Contact Hrs. 03).

(i) Basic Radio Telephony (RT) Procedure.

(ii) Introduction, Advantages, Disadvantages, Need for standard procedures.

(iii) Types of Radio telephony communication.

(iv) Radio telephony procedure, Documentation.

COURSE MODULE: NATIONAL CADET CORPS CAMP -I

Course Title: National Cadet Corps Camp I			
Course Code	**BNCCCAMP03GE05**	**Credits**	**2(Thr)+ 3(Pr)=05**
L /T + P	**30+90**	**Course Duration**	**10 Days (24 hours each)**
Semester	**III (Odd)**	**Contact Hours**	**30(Thr)+90(Pr)=120Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (I) Theory

180. **Course Objectives**.Cadets will be able to: -

(a) Acquire knowledge about the various aspects of personality development.

(b) Understand the concept of leadership traits, moral values and character traits.

(c) Develop awareness about the various types of natural disasters.

(d) Develop sensitivity to the changing environment and understand the importance of conservation.

(e) Understand the importance of hygiene and sanitation and common first aid procedures.

(f) Acquire awareness about various types of weapon systems in the Armed Forces.

181. **Expected Learning Outcomes**.After completing this course, the cadets will be able to: -

(a) Acquire adequate skill sets to overcome their weakness and reshape their personality.

(b) Imbibe good moral values and character traits in their daily life.

(c) Become useful members of the society and form part of disaster response team, if need arises.

(d) Respect and make efforts to conserve natural resources

(e) Follow good personal hygiene practices and provide first aid in emergencies.

(f) Be motivated to join the armed forces.

182. NCC Camp-I : Course Content Part (I) Theory

(a) **Unit 1. Personality Development (PD) (Contact Hrs. 04)**. Introduction to Personality Development, Factors influencing/shaping personality, Time Management and Interview Skills.

(b) **Unit 2. Leadership (LDR) (Contact Hrs. 04)**. Leadership Traits, Moral Values and Character Traits.

(c) **Unit 3. Disaster Management (DM) (Contact Hrs. 04)**. Assistance during natural disasters, Do's and Don'ts forNCC Cadets performing Disaster Management Duties

(d) **Unit 4. National Integration and Awareness (NIA)(Contact Hrs. 04)**. Water Conservation and Rain Harvesting, Waste Management an Energy Conservation

(e) **Unit 5. Health and Hygiene (H&H)(Contact Hrs. 04)**. Hygiene and Sanitation, First Aid in Common Medical Emergencies.

(f) **Unit 6. Infantry Weapons (IW) (Contact Hrs. 02)**. Characteristics of Company Support Weapons.

(g) **Unit 7. Weapon Training (WT) (Contact Hrs. 04)**. Characteristics of Point 22 Rifle and its Ammunition, Range Procedure and Safety Precautions**.**

(h) **Unit 8. Military History (MH) (Contact Hrs. 04)**. Guest lectures by War Veterans/decorated soldiers/veterans.

(i) **Unit 9. Communication (COM) (Contact Hrs. 04)**. Basics of communication.

NCC Camp-I : Course Content Part (II) Practical

183. **Course Objectives**. Cadets will be able to: -

(a) Understand that drill is the foundation of discipline and command a group for a common goal.

(b) Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.

(c) Develop awareness about different types of terrain and how it is used in Battle Craft.

(d) Develop the concept of various markings on the map and how they are co-related to the ground features.

(e) Acquire awareness about the various types of weapon systems in the Armed Forces.

(f) Understand the concept and importance of social service.

(g) Understand the various nuances of Personality Development.

(h) Understand the concept and importance of Physical Training in everyone's life.

(i) Acquire skill sets about various games and understand the importance of team work.

(j) Develop awareness about different cultures and different modes of its projection in artistic forms.

184. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Perform foot drill, arms drill, ceremonial drill and will be able to give out different words of command.

(b) Fire a weapon effectively with fair degree of marksmanship.

(c) Undertake point to point navigation and take part in route marches by day and night.

(d) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(e) Be motivated to join the armed forces.

(f) Acquire adequate skill sets to overcome their weakness and enhance their personality.

(g) Gain adequate physical and mental endurance capabilities.

(h) Play team games and be able to communicate and coordinate effectively in group events or situations.

(i) Respect the diversity of Indian culture and develop pride by showcasing their own culture to others.

185. NCC Camp-I : Course Content Part (II) Practical

(a) **Unit 1. Drill (Drill)(Contact Hrs. 16)**. Drill ki Aam Hidayaten aur Words of Command, Savdhan, Vishram, Aram Se aur Mudna, Khuli Line aur Nikat Line mein march, Salute Karna Parade Par, Visarjan aur Line Tod, Tej Chal, Tham aur Dhire Chal, Tham, Dahine, Baen, Aage aur Piche Kadam lena, Tejchaal se Mudna, Tejchaal se Salute karna, Tej kadamtaal aur Tham, Tej Kadamtaal se kadam badhana, Teenon Teen se ek file Banana aur ek file se Teenon Teen Banana, Rifle Ke Saath Saavdhan, Vishram aur Aaram se, Rifle ke saath Parade par aur saaj, Rifle Ke saath visarjan aur line tod, Bhumi Sashtra aur Uthao Sashtra, Bagal Sashtra aur Baaju Shastra.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 14)**. Stripping, Assembling, Cleaning of Point 22 rifle, Sight Setting and Sight Picture of Point 22 Rifle, Loading, Cocking and Unloading, Lying Position, Holding and Aiming of Point 22 rifle, Trigger Control and Firing of Shot, Theory of Group, Short-Range Aiming and Firing, Firing Practice I to VII.

(c) **Unit 3. Field Craft & Battle Craft (FC/BC) (Contact Hrs. 06)**.Introduction of Field Craft & Battle craft, Judging Distance, Indication of Landmarks and Targets, Observation, Camouflage and Concealment, Field Signals, Section formations.

(d) **Unit 4. Map Reading (MR) (Contact Hrs. 12)**. Introduction to Map and Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Types of Bearing and use of Service Protector, Prismatic Compass and its use, setting of a map, Finding North and own Position, Map to Ground and Ground to map, Point to Point march, Route March – I, Route March -II.

(e) **Unit 5. Infantry Weapons (IW) (Contact Hrs. 01)**.Characteristics of Battalion Support Weapons.

(f) **Unit 6. Social Service and Community Development (SSCD) (Contact Hrs. 04)**. Basics of Social Service and its need, Rural Development Programme, Civic Responsibilities: Cadets will participate in various activities throughout the camp e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc., Road /Rail Travel Safety

(g) **Unit 7. Personality Development (PD) (Contact Hrs. 06)**.Self-Awareness, Empathy, Critical and Creative Thinking, Decision making and problem Solving, Coping with Stress and Emotions, Time Management.

(h) **Unit 8. Obstacle Training (OT) (Contact Hrs. 02)**. OT Practice – I:- Untimed, Cadets will be familiarized with all the obstacles in the Obstacle Course and briefed about the correct method

to do them, OT Practice -II: Timed practice for all the cadets and record to be maintained.

(i) **Unit 9. Physical Training (PT) (Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in morning hours. Training has to be progressive in degree of difficulty to improve individual stamina and endurance. Training to include warming up, running, exercises to strengthen upper body, lower body and core muscles. Two period each to be devoted to route march by day and night respectively and one period will be earmarked for trekking expedition as part of Adventure Activity.

(j) **Unit 10. Games Training (G)(Contact Hrs. 09)**. Games Training will be carried out on each day of the camp, except on last day, in evening hours. Training has to be progressive in degree of difficulty to improve individual skills, coordination, team work and desire to excel. Training to ensure that each and every boy and girl cadets participate in at least one game activity everyday.

(k) **Unit 11. Cultural Activity (C)(Contact Hrs. 09)**. Cultural Activity will be carried out on each day of the camp, except on last day, in evening hours. Cadets have to divided in Nine Groups consisting of a mix of boy and girl cadets and preferably belonging to the same geographical area. Each group has to present the unique culture, custom, tradition, folk lore, songs, drama, paintings and cuisine during one hour allotted. There will be a prize for the best group to encourage participation and to develop pride in their unique culture. This training activity should ensure that each and every boy and girl cadet participate in at least one game activity every-day.

(l) **Unit 12. Spare (S)(Contact Hrs. 02)**. Two periods in each camp will be earmarked as spare to cover disruptions in training activity due to weather or other administrative reasons.

COURSE MODULE : NATIONAL CADET CORPS CAMP – II

Course Title: National Cadet Corps Camp II			
Course Code	**BNCCCAMP05GE05**	**Credits**	**2(Thr)+ 3(Pr)=05**
L /T + P	**30+90**	**Course Duration**	**10 Days (24 hours each)**
Semester	**V (Odd)**	**Contact Hours**	**30(Thr)+90(Pr)=120Hours**
Methods of Content Interaction	Lecture, Tutorials, Group discussion, Collaborative work, self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices		
Assessment and Evaluation	As per the University norms i.e. 25% internal assessment and 75% End of term exams , or 30% internal assessment and 70% end of term exams etc.		

Course Content Part (II) Theory

186. **Course Objectives**.Cadets will be able to: -

(a) Acquire the concept self-awareness, emotional intelligence, critical and creative thinking, decision making and problem solving.

(b) Learn about various indicators of good leadership and get an insight on principle of leadership and motivation.

(c) Develop awareness about the various types of natural disasters and disaster management organization in our country.

(d) Familiarize with natural resources, changing environment and understand the importance of conservation and waste management.

(e) Value the importance of Physical and Mental health and understand how to deal with wounds of various types.

(f) Acquire awareness about organization and role of an Infantry Battalion in the Armed Forces.

187. **Expected Learning Outcomes.** After completing this course, the cadets will be able to: -

(a) Develop a sense of responsibility, smartness in appearance and improve self-confidence, inculcate importance of empathizing with others, improve their deep-thinking ability and apply ideas and be able to face problems in a constructive manner with solutions.

(b) Imbibe good leadership traits and apply them in practical life and appreciate the visible outcome of leadership and motivation.

(c) Appreciate role of the org during emergency and become useful members of disaster response team, if need arises.

(d) Learn about the various natural resources, their utilization and practice method of conservation of these resources in daily life.

(e) Appreciate value of physical and mental health in daily life and spread awareness about treatment and care of wounds in their society.

(f) Be motivated to join the armed forces.

188. **NCC Camp-II : Course Content Part (I) Theory**.

(a) **Unit 1. Personality Development (PD) (Contact Hrs. 04)**.Self-Awareness, Emotional intelligence, Critical and Creative Thinking, Decision-Making and Problem Solving.

(b) **Unit 2. Leadership (LDR) (Contact Hrs. 02)**. Indicators of Good Leadership, Leadership and Motivation.

(c) **Unit 3. Disaster Management (DM) (Contact Hrs. 02)**. Disaster Management Organization NDMA and NDRF, Types of Disasters.

(d) **Unit 4. Environmental Awareness and Conservation (EAC) (Contact Hrs. 02)**. Natural Resources, Conservation and Management, Water Conservation, Waste Management, Energy Conservation.

(e) **Unit 5. Health and Hygiene (H&H) (Contact Hrs. 02)**. Physical and Mental Health, Treatment and Care of Wounds.

(f) **Unit 6. Infantry Weapons (IW) (Contact Hrs. 01)**. Organization of Infantry Battalion.

(g) **Unit 7. Weapon Training (WT) (Contact Hrs. 02)**. Characteristics of Point 22 Rifle and its Ammunition, Range Procedure and Safety Precautions.

(h) **Unit 8. Military History (MH) (Contact Hrs. 04)**. Guest lectures by War Veterans/decorated soldiers/veterans.

(i) **Unit 9. Communication (COM) (Contact Hrs. 04)**. Latest trends in communication.

NCC Camp-II : Course Content Part (II) Practical

189. **Course Objectives**. Cadets will be able to: -

(a) Inculcate spirit of discipline and follow command as a group for a common goal.

(b) Fire a weapon with adequate safety precautions necessary for safe firing.

(c) Understand the lay of the ground and use it skillfully towards own objective.

(d) Understand and use the map, satellite imagery and GPS effectively.

(e) Identify and be well versed with the primary weapom systems used in the Armed Forces.

(f) Lead a life of selflessness and provide service towards society development and nation building.

(g) Understand the importance of changing mindset, team work, social skills etiquettes and manners, interview skills and importance of effective communication in daily life.

(h) Learn the importance of physical fitness and nuances of physical training.

(i) Inculcate esprit-de-corps through team games.

(j) Have knowledge about cultural diversity of India and learn ways and means to adopt them.

190. **Expected Learning Outcomes**. After completing this course, the cadets will be able to: -

(a) Practice problem solving, critical thinking in real life situations.

(b) Practice leadership of small teams and groups under challenging environment.

(c) Develop a positive attitude, have manners and etiquettes in social life, develop a sense of cooperation for group or team work, participate in an interview with confidence and inculcate verbal and non-verbal communication skills.

(d) Develop adequate physical and mental endurance capabilities.

(e) Fire a weapon effectively with fair degree of marksmanship.

(f) Undertake point to point navigation and take part in endurance marches by day and night.

(g) Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

(h) Be motivated to join the Armed Forces.

(i) Play team games and be able to communicate and coordinate effectively in group events or situations.

(j) Perform foot drill, arms drill, ceremonial drill and will be able to take part in ceremonial parade and events.

(k) Respect the diversity of indian culture and develop pride by showcasing their own culture to others.

191. NCC Camp-II : Course Content Part (II) Practical

(a) **Unit 1. Drill (Drill) (Contact Hrs. 16)**. Tejchaal se Mudna, Tejchaal se Salute karna, Tej kadamtaal aur Tham, Tej Kadamtaal se kadam badhana, Teenon Teen se ek file Banana aur ek file se Teenon Teen Banana, Rifle Ke Saath Saavdhan, Aaram se, Rifle ke saath Parade par aur saaj, Rifle Ke saath visarjanaur line tod, Bhumi Sashtra aur Uthao Sashtra, Bagal Sashtra aur Baaju Shastra, Salami Sashtra, Squad Drill, Guard Mounting, Guard of Honour, Platoon / Company Drill, Word of Command and Instructional Practice.

(b) **Unit 2. Weapon Training (WT) (Contact Hrs. 14)**. Stripping, Assembling, Cleaning of Point 22 rifle, Sight Setting and Sight Picture of Point 22 Rifle, Loading, Cocking and Unloading, Lying Position, Holding and Aiming of Point 22 rifle, Trigger Control and Firing of Shot, Theory of Group, Short-Range Aiming and Firing, Musketry Training, Firing Practice I to VII.

(c) **Unit 3. Field Craft & Battle Craft (FC/BC) (Contact Hrs. 06)**. Observation, Camouflage and Concealment, Field Signals, Section formations, Fire Control Orders, Fire and Movement, Knots and Lashings.

(d) **Unit 4. Map Reading (MR) (Contact Hrs. 12)**. Introduction to Map and Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Types of Bearing and use of Service Protector, Prismatic Compass and its use, setting of a map, Finding North and own Position, Map to Ground and Ground to map, Point to Point march, Endurance March – I (10 KM), Endurance March -II (20 KM).

(e) **Unit 5. Infantry Weapons (IW) (Contact Hrs. 01)**. Characteristics of Infantry Company support weapons and 5.56 MM INSAS Rifle.

(f) **Unit 6. Social Service and Community Development (SSCD)(Contact Hrs. 04)**. Contribution of Youth Towards Social Welfare: Cadets will participate in various activities throughout the camp e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc., Social Evils: Female Feticide, Dowry, Child Abuse, Trafficking and Corruption, Drug Abuse and Drug Trafficking, Protection of Children and POCSO Act 2012.

(g) **Unit 7. Personality Development (PD)(Contact Hrs. 06)**. Change Your Mindset, Team Work and Team Building, Social Skills, Etiquettes and Manners, Interview Skills, Communication Skills–I,

Communication Skills -II

(h) **Unit 8. Obstacle Training (OT)(Contact Hrs. 02)**. OT Practice – I: Untimed, Cadets will be familiarized with all the obstacles in the Obstacle Course and briefed about the correct method to do them, OT Practice -II: Timed practice for all the cadets and record to be maintained.

(i) **Unit 9. Physical Training (PT) (Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in morning hours. Training has to be progressive in degree of difficulty to improve individual stamina and endurance. Training to include warming up, running, exercises to strengthen upper body, lower body and core muscles. Two period each to be devoted to route march by day and night respectively and one period will be earmarked for trekking expedition as part of Adventure Activity.

(j) **Unit 10. Games Training (G)(Contact Hrs. 09)**. Physical Training will be carried out on each day of the camp, except on last day, in evening hours. Training has to be progressive in degree of difficulty to improve individual skills, coordination, team work and desire to excel. Training to ensure that each and every boy and girl cadets participate in at least one game activity everyday

(k) **Unit 11. Cultural Activity (C) (Contact Hrs. 09)**. Cultural Activity will be carried out on each day of the camp, except on last day, in evening hours. Cadets have to divided in Nine Groups consisting of a mix of boy and girl cadets and preferably belonging to the same geographical area. Each group has to present the unique culture, custom, tradition, folk lore, songs, drama, paintings and cuisine during one hour allotted. There will be a prize for the best group to encourage participation and to develop pride in their unique culture. This training activity should ensure that each and every boy and girl cadets participate in at least one game activity every day (Contact Hrs. 09)

(l) **Unit 12. Spare (S) (Contact Hrs. 02)**. Two periods in each camp will be earmarked as spare to cover disruptions in training activity due to weather or other administrative reasons.

SECTION II : RULES AND REGULATIONS

GOVERNING NCC CREDIT COURSE UNDER CHOICE BASED CREDIT SYSTEM AS GENERIC ELECTIVE FOR SENIOR DIVISION/WING

RULE 1 :Definitions of Key Terms

General Definitions

'Choice Based Credit System' (CBCS).The CBCS provides choice for the student to select courses from the prescribed courses (Elective or Soft – Skill courses). It provides a 'Cafeteria' approach in which the students can take courses of their choice, learn at their own pace, study additional courses and acquire more than the minimum required credits, and adopt an inter-disciplinary approach.

'Academic Year'.Two consecutive (one odd + one even) semesters shall constitute one academic year.

'Credit Course'.Course, usually referred to as paper having specific title and code number, is a component of a programme. It consists of a list of topics/concepts/theories/principles/activities/tasks etc. which a student has to learn during the programme of study. Each course has some credits according to the nature and load of content. Each course should define the learning objectives/learning outcomes. A course may be designed to be delivered through lectures/tutorials/laboratory work/field work/out reach activities/project work / vocational training / physical training /viva / seminars /term papers / assignments / presentations / self-study work etc., or a combination of some of these.

'Course Instructor/Teacher'.The course instructor generally will be a teaching faculty who has taken up the responsibility of teaching it and evaluating the performance of the students in that course. NCC course will be imparted by the ANO (Associate NCC Officer) and PI (Permanent Instructor) / Girl Cadet Instructor (GCI) staff together according to their area of specialization. Certain specific topics and training activity is imparted by Military Officers and Whole Time Lady (WTLO).

'Credit'.A unit by which the course work is measured. It determines the number of

hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work per week. Thus, in each semester's NCC course, credits are assigned on the basis of the number of lecture/tutorial/field work/physical training/excursions and other forms of learning required for completing the contents in a 15-18 week schedule. 2 hours of laboratory work/field work is generally considered equivalent to 1 hour of lecture.

i. 1 credit = 1 hour of instruction per week (1 credit course = 15 contact hours of instruction per semester)

ii. 4 credit = 4 hour of instruction per week (4 credit course = 60 contact hours of instruction per semester)

iii. 1 credit = 2 hour of practical per week (1 credit course = 30 contact hours of instruction per semester)

iv. 4 credit = 8 hour of practical per week (4 credit course = 120 contact hours of instruction per semester)

Number(s) of credit(s) assigned to a particular course are mentioned in the detailed syllabus of the courses.

'Credit Point'.It is the product of the grade point and the number of credits for a course.

'Letter Grade'.It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P, and F. A letter grade is assigned to a student on the basis of evaluation of her/his performance in a course on a ten-point scale.

'Grade Point'.It is a numerical weight allotted to each letter grade on a 10 -point scale.

Letter Grade	Grade Point
O	9-10
A+	8-9
A	7-8
B+	6-7
B	5-6
C	4-5
P	4
F	0
Ab	0

Note : University may use the above said criteria for providing the grades to the students or may adopt the same criteria which they are practicing for providing the letter grade and grade point for other subjects.

'Programme'.An educational programme leading to the award of degree, Diploma or Certificate course. NCC course shall be offered only at under graduate level programmes for any stream or type of programme for example – Nonprofessional courses BA, B.SC. B. Com etc. professional courses – B.A., LLB, B.A./B.Sc., B.Ed., BCA, BBA, B. Tech, MBBS etc.

'Credit – Based Semester System (CBSS)'.Under the CBSS, the requirement of awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.

'Semester'.Each semester shall consist of 15 to 16 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June. The Credit-based semester system provides flexibility in designing curriculum and assessing credits based on the course content and hrs of teaching.

'Semester Grade-Point Average (SGPA)'. Semester Grade Point Average or SGPA, is an average grade point earned by the student at the end of an academic session i.e. semester at college. The formula for calculation of SGPA is the sum of all the credit points awarded for the subjects divided by total credits allotted to that semester. It shall be expressed up to two decimal places.

'Cumulative Grade Point (CGPA)'. It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all the semesters. It shall be expressed up to two decimal places.

'Transcript/ Grade card or certificate'. Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade and / or marks secured) along with SGPA of semester. Overall Grade Certificate will be issued on completion of the course showing semester wise SGPA & CGPA.

'The University/ College/ Institution'. The University/ College/ Institution in present document means the any recognized central/ state/ Deemed university or institution meant for higher education.

'NCC Course'. In the present document 'NCC Course' means the course designed for imparting NCC curriculum in educational institutions as elaborated in this

document under Choice Based Credit System as a General Elective Course for Senior Division/ Senior Wing.

Definitions Specific to NCC

'Institutional Training'. Implies training conducted for NCC cadets as per Training Manuals and Cadet Hand Book issued by DG NCC, Ministry of Defence.

'Common Subjects'. Implies those subjects specifically taught in NCC curriculum which are common to Army, Navy and Air Force and general training that can be imparted by Associate NCC Officers or Military staff or a suitably qualified person.

'Specialised Subjects'. Implies subjects specifically taught in NCC curriculum by military instructors comprising specialised topics for Army, Navy and Air Force Cadets respectively.

'NCC Camps and Centralised Training Events'. Collective training events conducted usually for 10 days with large number of cadets living under field conditions in selected places away from home. The training camp comprises of focused physical and mental training routines of different types as per syllabus and curriculum. Some training like route marches may happen overnight. Camps include, adventure camps, national integration camps,

Republic Day Parade Training Camps, ThalSainik, VayuSainik and NauSaink camps and other outdoor training activities as described in DG NCC Training Manuals.

NCC 'B' and 'C' Certificate Examinations. These are defined in Special National Cadet Corps Order 2020 issued by DG NCC, Ministry of Defence.

'Training Faculty'.Persons suitably trained & responsible for imparting training of different types and nature to students.

'Military Officers'. They are regular commissioned officers of Indian Armed Forces who serve in the NCC and render command, administrative and instructional functions for NCC.

'Whole Time Lady Officers (WTLO)'. They are women officers commissioned directly into the NCC.

'Associate NCC Officer (ANO)'. ANO will be a university/ college/ school faculty who are qualified in the PRCN (Pre-commission Course of NCC) conducted by DGNCC and are commissioned as Associate Officers in NCC as defined in NCC Act 1948 and NCC Rules. They have the eligibility to impart certain component of NCC Course and undertake training of cadets.

'Permanent Instructor (PI)'. PI Staff are Junior Commissioned Officers (JCO) and Non-Commissioned Officers (NCO) on deputation from Armed Forces to NCC as governed by NCC Act 1948. Retired PI Staff may be hired by a college as a substitute for ANO with prior concurrence of DGNCC.

'Girl Cadet Instructors (GCI)'. GCI are lady instructors' equivalent to PI Staff for specifically imparting instructions to women NCC cadets of Senior Wing.

'NCC Organizational Structure'. NCC is an adjunct of Indian Armed Forces that operates under the ambit of the Ministry of Defence through the Defence Secretary with Raksha Mantri as the political head.

'DGNCC'.Directorate General of NCC renders the command and administrative function of NCC. The executive head of NCC is Director General of NCC who is a Lt Gen rank officer from the Army.

'State NCC Directorate'. State NCC Directorates are directorates subordinate to DG NCC and render command and administrative control to NCC at State level and is headed by an Additional or Deputy Director General

'NCC Group HQ'. NCC Group HQs are subordinate to State Directorates and render

command and administrative control to NCC at district or cluster of districts in a state and is headed by a Group Commander.

‘NCC Units’. NCC Units are subordinate to Group HQs at the lowest rung of the command and administrative control exercised by military officers and is headed by a Commanding Officer or Officer Commanding. The NCC Units directly engage

with educational institutions and ANOs and are primarily responsible for training of NCC in institutions under their jurisdiction.

'NCC Division/ Wing'. NCC Division/Wing are minor units of senior division/wing of NCC comprising of 160 senior cadets allotted to educational institutions. It can be further subdivided into NCC platoons of 53 to 54 cadets.

'NCC Troop'. NCC Troop are minor units of junior division/wing of NCC comprising of 100 junior cadets allotted to educational institutions. It can be further subdivided into NCC half troops comprising of 50 junior cadets.

RULE 2 : Admission and Other Provisions

The NCC Course under the CBCS as 'General Elective' shall be of three years (Six Semester) duration which may be completed in maximum duration of four year (8 semesters).

Students may complete NCC course minimum in Six semesters and maximum in eight semesters. Cadets may complete their 'B' Certificate in four semesters minimum and maximum six semesters. Cadets already having 'B' certificate may complete their 'C' certificate in minimum two semesters and maximum four semesters, and they may join NCC course 5 in first semester of college.

The intake to the course shall be decided according to the seats allotted to University/ college/ institution by DG NCC according to the availability of required infrastructure, faculty and resources.

The admission to the NCC Course under the CBCS as a 'General Elective' shall be governed by the provisions as laid down by the NCC Act 1948/ SNCCO 2020/ contemporary SNCCO and Academic council of parallel body of university. These rules and regulations may be modified from time to time (if needed) by the Academic body of the university in consultation with DG NCC or Act/ Ordinances prepared by DG NCC.

Students will be enrolled as NCC cadet as per existing Acts & Rules.

At the time of reporting for admission, the candidates are required to present medical & physical fitness documents as well as the admission proof of the university and submit the self-attested copies of aforesaid documents.

The admission of any candidate is liable to be cancelled without giving any further notice forthwith or at any time during the period of the course, if it is detected that the candidate has/had produced fake/forged certificate (s)/ document(s), indulged in any act of misconduct/indiscipline and has/had concealed any other relevant information at the time of

admission.

The admission of the candidate to the course shall be subject to such ordinance, rules and regulations as may be framed from time to time by the university in consultation with DG NCC and NCC act 1948.

DG NCC shall have jurisdiction in case of any dispute relating to the provisional admission in the course.

RULE3 : For Eligibility, Medium of Instrs & Categories

Eligibility Conditions. Be governed by provisions of NCC Act and Rules and directions from DG NCC from time to time. These are readily available on DG NCC website www.nccindia.nic.in.

Standards for physical Fitness criteria for Male and Female Cadets/students shall be governed by provisions of NCC Act and Rules and policy documents released by DG NCC from time to time.

RULE4 : Medium of Instruction. English or Hindi. However, ANOs and training instructors are free to use vernacular language for helping students who are not fluent in Hindi or English.

RULE 5 : Course and Students. NCC course is unique, due to the nature of its military training content and component hence it is normally offered to students enrolled as NCC cadets only. This NCC Course is primarily designed for students enrolled as NCC cadets under provisions of NCC Act 1948. Institution allotted NCC will have the obligation to offer this course to all students from their institute enrolled as cadets as per vacancy allotted to the institution by DG NCC as also to those cadets enrolled under Open Quota seats.

RULES 6 :NCC Course for 'Cadet' Category 6.1. NCC Course for 'Cadet'

(a) NCC course for Cadets comprises of total 24 credits (08 for theory, 06 for practical and 10 for camp component) over 6 semesters courses i.e., NCC course I to NCC course VI and NCC Camp I & NCC Camp II.

(b) Cadets will not only earn the academic credits but also be given 'B', and 'C' Certificates after passing the exam conducted by DG NCC.

(c) Students would be free to join NCC Course I or subsequent Courses in any semester, not necessarily Semester I or the designated Semester.

(d) A student can opt for only one of the six Courses per semester and that too sequentially implying NCC Course II cannot be joined before completing NCC Course I and so on.

(e) Under this category a fresh student/cadet will compulsorily have to opt for all six NCC Courses in minimum six Semesters. However, 'B' certificate holder may directly join NCC Course Number 5 in any semester. He will have to complete NCC Course Number 5 and NCC Course Number 6 for obtaining 'C' certificate and he will be awarded credit points only for NCC Course Number 5 and NCC Course Number 6.

NCC GENERAL ELECTIVE CREDIT COURSE DESIGN SUMMARY					
Semester	Credits Allocated			Total	Remarks
	Theory	Practical	Camp		
Semester - I	1	1		2	
Semester - II	1	1		2	
Semester – III	1	1	5	7	Credits of 1st Camp merged with 3rd Sem
Semester – IV	2	1		3	
Semester – V	1	1	5	7	Credits of 2nd Camp merged with 5th Sem
Semester - VI	2	1		3	
Total	**08**	**6**	**10**	**24**	**Twenty-Four Credits**

RULE 7 :Mobility& Credit Bank

The mobility shall be permissible from the regular mode programme to the regular mode programme of learning only and cannot be replaced by open/distance/online programme.

It shall be the responsibility of the student to assess the feasibility and practicality of vertical mobility (across the Universities), as it doesn't entitle a student to be exempted or relaxed from any of the requisites (sessional, attendance, assignments, End-semester examinations and programme duration etc.) for completing the course.

After completing one semester/ one year cadet/student may pursue NCC course from any other institution/ University/ College having NCC and carry credits in credit bank as per NEP 2020. The NCC students/ Cadets of some other university shall in any case be admitted only at the beginning of the session to the fulfilment of the other requirements of the NCC Course (attendance, Formative assessment, Field-work, practical etc).

A student of NCC course availing inter-university mobility shall continue to be a bonafide student of the university where he/she initially got admission and as per the university/ Institutional rules for the inter-university mobility.

In case of inter-university mobility of NCC cadet for NCC Course is also the subject to availability of NCC for the cadets in that particular university/ institution and it shall be interpreted as inter-battalion migration (means another regimental no. shall be allotted to the cadet).

RULE 8 :Examination & Promotion

The examination of all the NCC courses shall be internal in nature and generally consisting of continuous internal assessment and End of semester Examination. For the preparation of final grade in a particular course, the continuous internal assessment (Formative in nature) and the End Semester Examination (Summative in nature) shall have the weightage as decided for other courses by the university as per the University norms for e.g., 25% internal assessment and 75% End of term exams or 30% internal assessment and 70% End of term exams etc.

For assigning the Grades and credit points to NCC Course Universities/ Institutions are free to use the same criteria which are decided by their academic bodies for providing the grades and credit points to the other courses

RULE 9 :Continuous Internal Assessment

The Continuous Internal Assessment of the NCC Cadets' and NCC students' learning and performance shall be carried out by the ANOs and PI staff.

Continuous Internal Assessment will be 100% Practical that includes Drill Square test, Map Reading,

Weapon Training, Field craft & Battle craft.

CO of nominated NCC Unit will be deemed as Head of the Department and shall be responsible for approving the schedule and pattern of the continuous internal examination.

ANO of the nominated institute shall maintain all the records related to attendance, teaching and assessment in a systematic manner, including award of final grade.

In case a student fails to appear in any Continuous Internal Assessment, they will be given a chance to reappear in retest and in case he/she fails to obtain 'P' grade he/she will be made to repeat the exam by carrying it forward for semester retest .

RULE 10 :Re-appear in the End Semester Examination for Improvement of Grades

If a student wishes to improve her/his grade(s) in NCC course(s), she/he can re-appear in the End Semester Examination in the subsequent odd/even semester(s), whenever the examination of the particular course(s) is held, on payment of fees in addition to the prescribed semester fee within the maximum permissible duration for the programme of study of the student/cadet.

A student may improve her/his points/grade by reappearing in the End Semester Examination of a course as per the provisions of reappearing mentioned above. In such cases points obtained by the student in the Continuous Internal Assessment of the particular course shall be carried forward to the subsequent End Semester Examination of the course. However, in such case, the points/grades obtained on the basis of latest appeared End Semester Examination shall be considered for calculation of final CGPA of the programme.

The re-appear examination of a course for improvement of grade shall be based on the syllabi of the course in force at the time of initial registration to the course.

A student who has got the Migration/Transfer Certificate issued from the University shall not be allowed to re-appear in any examination for improvement of grade.

RULE 11 :Repeating Courses

A student having attendance shortage in any course may repeat the course by taking re-admission in that course in subsequent odd/even semester(s), whenever the course is being offered, within the maximum permissible duration of the programme.

If a student repeats a course, she/he has to fulfil all the desired requirements afresh including attendance, Continuous Internal Assessment and the End Semester Examination. In such case the course content shall be based on the syllabi of the course in force at the time of repetition of the course.

RULE 12 : Promotion Rules

A student shall be declared as 'promoted' to the next semester when she/he earns 'P' Grade or above in the last concluded semester examination, maintaining the spirit and pattern of semester system and covering

the mandatory components, such as Continuous Internal Assessment and End-Semester Examination in the NCC Courses.

A student shall be 'Provisionally Promoted' to the next semester if she/he secures less than 'P' grade but he /she has to pass all the courses of NCC course within permissible duration.

A cadet shall be eligible to attend the 'B' Certificate exam if he/she passed all the first four semester NCC course and completed one ATC/CATC. Similarly, cadet will be eligible to attend 'C' certificate examination if he/she has 'B' certificate and he /she has passed V, VI semester NCC course and attended one CATC/ATC after fourth semester and after having obtained 'B' certificate.

If a cadet/student is repeating a course in an academic session, whatever may be the reason, it shall not be counted in the total number of seats and shall not affect the fresh intake of cadets / student in that academic session.

RULE 13 :Computation of SGPA & CGPA

13. Computation of SGPA and CGPA . University may use their own criteria for giving the SGPA & CGPA which is prepared by the authorized academic body for the other courses.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

SUBJECT CODE – MC 6 (C)

CATEGORY – NNP

SUBJECT NAME – PHYSICAL EDUCATION

SEMESTER – VI

Fitness Management

UNIT-I

1 Introduction

Concept of fitness and wellness, components and their significance in Modern fitness.

Types of fitness and its testing.

Factors affecting physical fitness and values of physical fitness.

Concept of fitness management in modern era.

Precaution before, during and after exercise.

Prominent health problem associated with inactivity.

1.7 Concept of weight training and principles of weight training.

Brief introduction of various fitness centre equipments/gadgets.

Cardiac machines

Strength training machines.

Swiss ball, terra bands etc.

Sauna & Steam bath, Jacuzzi etc.

UNIT-II

2 Exercise for fitness & designing of the programme.

Understanding suitability and form of exercise for fitness.

Aerobic and anaerobic exercise.

Calisthenics exercise.

Other forms of exercise - Dance, aquatic, skating, skipping rope etc.

Calculate target heart rate zones for various exercise intensities.

Women & weight training, pregnancy, and post natal exercise, exercise and aging.

Concept of free weight Vs. Machine, sets & repetitions, variation of sets & repetitions for weight training.

Concept of designing different fitness training programme for different age & life style people.

Concept of designing a weight reduction training programme.

UNIT-III

3 Establishment & Management of Fitness Centre.

Environmental considerations for fitness centre.

Fitness center - operations.

Evolutions of fitness center culture.

Principle of starting a fitness center - location policy, offer of programmes, record keeping, code of ethics.

Different exercise equipment & their management.

Personal outfits & gadgets required for the members of the fitness centre.

Safety measures, prevention & Management of injury in a fitness centre.

Membership for fitness centre and its type. Fitness centre agreement form.

UNIT-IV

4 Carrier option & business of fitness centre.

Scope of a fitness trainer.

Qualification & Qualities for a fitness trainer.

Management Skills needed for a successful fitness manger.

Instructor's duties for handling beginners.

Individualized/group grooming programmes and reports.

4.6. Personal training - Various aspects.

4.7 Formalities prior to conducting fitness programme for various categories of clients.

Basic marketing & Promoting business

Budgeting.

Marketing & Clientage.

Record keeping.

Public relations.

Exercise & music

UNIT-V

5 Nutrition & Weight Management

Nutrition - daily caloric requirement and daily energy expenditure.

Exercise & energy expenditure and body weight.

Macronutrients concerns before, during and after exercise.

Obesity & its assessment, body mass index, body composition & determination of desirable weight.

Effects of excess weight & appraisal of body fat.

Dieting versus exercise for weight control.

Fat- Dissolving criteria & spot reduction.

PHYSIOLOGY

UNIT-I

Introduction

Concept of Physiology

Essential properties of life

Passage of water and soluble across cell membrane

Cardio-Vascular System and Blood

Composition and functions of blood

Cardiac Cycle

Blood pressure and its maintenance

Cardiac output and its regulation

UNIT-II

Respiratory System

Mechanism of Respiration

Pulmonary ventilation and its regulation

Secretion and functions of Digestive Juices

Functions of Liver

Absorption of Food

Digestive system

Metabolism of Food (Carbohydrates, Fat & Protein)

Temperature regulation.

UNIT-III

Nervous System

Functions of important parts of system (cerebrum, cerebellum, medulla oblongata and spinal cord.)

3.2.2 Functions of autonomic nervous system

Sensory System

General sensations- Coetaneous and Kinesthetic

Visual and Auditory senses.

UNIT-IV

Excretory system

Excretion of water Through Skin, Kidney and Gastrointestinal Tract.

Endocrine system

Secretion and function of Endocrine Glands- Pituitary, Thyroid, Adrenal and Pancreas.

Reproductive System

Introduction to Physiology of human reproduction.

Transmissions of hereditary characteristics.

UNIT-V

5. Physiology of Exercise

Physiological concept of Health and Fitness.

Effect of exercise on- Circulatory, Respiratory and Muscular Systems.

Changes during Muscular Contraction.

Nervous control of Muscular activity.

Training, Conditioning and Warm-up.

Oxygen Debt, Second Wind, Stitch and Cramp.

HANDBALL

UNIT-I

1 Introduction of the game and historical development with special reference to India.

2. Important tournaments held at National and International Levels.

3. Rules and their interpretations.

4. Duties of Officials.

5. Fundamental Skills.

Passing and receiving techniques.

Overhand Pass

Push Pass

Wrist Pass

Bounce Pass

Behind the back Pass

Ball Reception Techniques : -

Catching at Chest Level

Catching below waist

Catching at sides

Catching at head height

Catching in the air

Dribbling :

High Dribbling

Low Dribbling

Shooting :

Set Shot

Jump Shot Long

Jump Shot High

Wing Shot

6. Positional Play in attack & defense.
7. Drills and Lead-up games.

FUNDAMENTAL OF COMPUTER & INFORMATION TECHNOLOGY

UNIT-I

1. Introduction to computers

Brief history development of computers

Generations of computers.

Types of PCs-Desktop, Laptop, Notebook, Laptop, Workstations etc.

Basic components of a computer system

Memory- Ram, Rom, and other types of memory

Operating system

Need of Software, Types of Software

Types of Virus, virus detection and prevention.

Binary Number system

UNIT-II

2. Introduction to windows

Using Mouse and moving icons on the screen

My Computer, Recycle Bin, Status Bar

Start-menu selection, running an application,

Window Explorer to view files, folders and directories, creating and renaming of files and folders,

Operating and closing of different windows, Minimize, Restore and Maximize forms of windows,

Basic components of a window: Desktop, Frame, Title Bar, Menu Bar, Status Bar, Scroll Bars, Using right button of the Mouse,

Creating shortcut, Basic Windows Accessories: Power Point. Presentation, Notepad, Paint, Colculator, Word pad, using

UNIT-III

3. Introduction to MS Office & Word Processor

Types of Word Processor

Creating and Saving a documents, Editing and Formatting a Document including Changing colour, Size Font, alignment of text,

Formatting paragraphs with line or paragraph spacing, adding headers and footers, numbering pages.

Using grammar and spell check utilities, etc., printing a document.

Inserting word art, clipart and Pictures,

Page setting, Bullet and Numbering, Borders, Shading Format painter find and replace.

Inserting Tables, Mail Merge.

UNIT-IV

4. Introduction to information & Communication Technology

Concept, Importance, Meaning & Nature of Information & Communication Technology

Need of Information & Communication Technology in Physical Education.

Scope of ICT in Education & Physical Education.

Teaching Learning Process, Publication, Evaluation, Research Administration.

Paradigm shift in education due to ICT content with special reference to curriculum.

Role of Teacher, Methods of Teaching, Classroom Environment, Evaluation procedure.

UNIT-V

5. INTRODUCTION TO INTERNET BROWSING

Internet: Evolution, Protocols, Interlace Concepts,

Internet Vs Intranet, Grawth of Internet, ISP.

Connectivity-Dial-up, Leased line, VSAT etc., URLs, Domains names,

Application, E-mail: Concepts, POP and WEB Based E-mail, merits, address, Basics of sending & Receiving, E-mail protocols, Mailing List, Free E-mail services.

Telnet Concept, Remote Logging, Protocols, Terminal Emulation. Massage Board, Internet Chatting voice chart text chat.

World Wide web (www)- History, working web browsers, Its functions, concept of search Engines, Searching the Web, HTTP, URLs, Web Servers web; Protocols.

Web publishing concepts, Domain name Registration, pace on Host server for web sits HTML, Design tools HTML editors, Image editors, Image editor, Issues in Web site creations & maintained, FTP software for upload web site.

Concepts of Hypertext, Versions of HTML, Elements of HTML syntax, Head & Body Section, Building HTML documents, Inserting tests, Images, Hyperlinks, Backgrounds and Colour controls, Different HTML, tags, Table layout and presentation, Use of font size & Attributes.

Practicals:

The practicals will be conducted based on the syllabus.

SEMESTER: VII

CATEGORY: EIEL

SUBJECT CODE: EI 71(A)

SUBJECT NAME: SIMULATION & MODELING

COURSE OBJECTIVE: [60Hrs]

This course is proposed as an elective course to students across the disciplines with the aim of imparting basic understanding of Modeling and Simulation so that the students will find it easy to use this knowledge in profession for applying to various engineering systems and design.

UNIT-I[12Hrs]

Introduction: objectives of modeling, System theory and state variables Type of Model: Analytic, Simulation, Measurement, Analytic Modeling, Probability theory, Random variables, Poisson process, Markov chains.

UNIT-II[12Hrs]

Queuing Theory: Little's Law, M/M/1, M/M/1/k, M/M/C, queuing Models, M/G/1[Impact variation in service times]

UNIT-III[12Hrs]

Petrinets: Stochastic Petrinets[SPN],GSPN.

UNIT-IV[12Hrs]

Simulation Modeling: Continuous and discrete event Simulation, Monte carlo Simulation,Pseudo random number generation, Non uniform Random variable Generation, Simulation Languages Features: Simpack, GPSS, GASP IV, CSIM, Estimation of Simulation Outputs/Output Matrix, confidence Intervals, Regenerative Simulation, Method of Batch Means.

UNIT-V[12Hrs]

Case Studies: Analytic Vs Simulation Models, Application to Operating Systems, Data bases, Networks Architectures.

COURSE OUTCOMES:

Demonstrate the ability to apply knowledge of probability and statistics, optimization techniques, simulation modeling, engineering economic analysis and cost control, and other technical sciences and specialties necessary in the field of industrial engineering and management

REFERENCES:

P.A. Fishwick Getting started with simulation programming in C & C++.

A. Narsingh Deo, Simulation with digital computer

LIST OF EXPERIMENTS

1. Computer Generation of Random Numbers.
2. Chi-square goodness-of-fit test.
3. One-sample Kolmogorov-Smirnov test
4. Test for Standard Normal Distribution
5. Testing Random Number Generators.
6. Monte-Carlo Simulation.
7. Simulation of Single Server Queuing System.
8. Simulation of Two-Server Queuing System.
9. Simulate and control a conveyor belt system
10. Two-sample Kolmogorov-Smirnov test.

SEMESTER: VII

CATEGORY: EIEL

SUBJECT CODE: EI 71(B)

SUBJECT NAME: DATA ACQUISITIONS SYSTEMS

COURSE OBJECTIVE: [60Hrs]

To understand concepts of acquiring the data from transducers/input devices, their interfacing and instrumentation system design. Data Acquisition System (DAS): Single channel and multichannel, Graphical Interface (GUI) Software for DAS, RTUs, PC-Based data acquisition system

UNIT-I[12Hrs]

Display System: Seven segment Dot matrix, Multiplexed, Code converter, LCD (construction, working and Programming Hitachi controller), Plasma and vapor displays.

UNIT-II[12Hrs]

Recorders: Galvanometric type, Null type, Potentiometer type, Strip Chart and circular chart type ,Magnetic tape recorder-principle & operation, Digital tape recorders.

UNIT-III[12Hrs]

General Telemetric Systems: land line & RF telemetry, voltage, current and Position telemetry with feedback mechanism, RF telemetry, Amplitude modulation , Frequency modulation , Pulse modulationpulse amplitude modulation, pulse code modulation, wire ine and radio channels, Microwave channels, Radio ink, Transmitting and receiving antenna, telemetry with time and frequency division multiplexing, telemetry hardware, band width and Noise reduction(interference, Grounding, shielding, Guarding).

UNIT-IV[12Hrs]

Data transfer techniques: DMA controller and data transfer in DMA mode, Serial data transmission method and standards, 4-20 mA current loop, RS-232C: specifications connection and timing , RS422,RS-423, GPIB/IEEE-488 standard digital interface, parallel communication,

Centronix port, communication protocols, Local Area networks, Firewire, Universal serial bus, HART protocol, Foundation – Fieldbus, ModBus, TCP/IP, Data compression, Encryption, Error detection & correction techniques, Optical disk storage.

UNIT-V[12Hrs]

Data Acquisition System(DAS): single channel and multi channel, data conversion, Super Visory control and data acquisition system(SCADA), data acquisition system around microprocessor, micro controller & PC.

COURSE OUTCOMES:

The process of data acquisition has become easier, more versatile, more reliable, and more accurate using electronic equipment. The type of equipment available for data acquisition has changed over the years. Now, we can use a simple data logger or a complicated computer system.

References:

1. Mathivanan N "Microprocessor PC Hardware and interfacing", PHI, New delhi
2. H S Kalsi " Electronic Instrumentation" TMH, New delhi
3. Patranabis- Principles of Industrial Instrumentation 3rd Ed., TMH
4. Singh- Industrial Instrumentation & Control 3rd ed., TM

List of Experiments

1. Study of data acquisitions systems.
2. Study of Optical Instrumentation and Sensors
3.Study of DMA controller.

SEMESTER: VII

CATEGORY: EIEL

SUBJECT CODE: EI 71(C)

SUBJECT NAME: OPTICAL INSTRUMENTS AND SENSORS

COURSE OBJECTIVE: [60Hrs]

To make the students able to understand different aspects of optical instrumentation.

UNIT-I[12Hrs]

Introduction to vector nature of light, Propagation of light, Propagation of light in a cylindrical dielectric rod, ray model, wave model. Theory of image formation, Review of aberration, Comma, acclamation, distortion, Chromative aberration, Osages.

UNIT-II[12Hrs]

Different types of optical fibres, model analysis of a step index fiber. Signal degradation on optical fiber due to dispersion and attenuation.

UNIT-III[12Hrs]

Optical fiber in instrumentation use of optical fibers as sensors, modulation techniques for sensors fiber optic power measurement. Stabilized calibrated light sources end-to-end measurement of fiber losses, optical signal processing.

UNIT-IV[12Hrs]

Optical power meters, optical attenuators, optical spectrum analyzer, optical switching & logic gate and measurement techniques like Optical time domain reflectometry, (OTDR), Attenuation measurements

UNIT-V[12Hrs]

Optical Sources & detectors: LED and LASERS, photo detectors, pin detectors detector responsitivity – noise, optical receivers. Integrated optical devices.

COURSE OUTCOMES:

After the successful completion of the course the students will be able to:

1. explain the basic concepts of optical transmitting and receiving
2. describe different opto- electronic devices
3. elucidate different methods of interferometry
4. describe selection of the appropriate optical fiber sensors for industrial application

LIST OF EXPERIMENTS;-

1.Optical Instrumentation and Sensors

1. Setting up Fiber Optic Analog Link and Digital Link
2. Study of Intensity Modulation Technique using Analog input signal
3. Pulse Width Modulation in Fiber Optic Link.
4. Measurement of propagation or attenuation loss in optical fiber.
5. Measurement of bending loss in optical fiber.
6. Numerical Aperture (NA) of the fiber.

7.Study of Diffraction gratings.

8.Study of Michelson Interferometer.

9.Study of Reflection Holography.

10.Study of Transmission Holography

REFERENCES:-

1. An Introduction to Fiber Optics by Cherin
2. Optical fiber – System Technology, design and applications by C.K. Rao
3. Optical Fiber Sensors, Vol.12 by Culshaw B. and Dakin J. (Ed.), Arctech House
4. Fundamentals of Fiber Optics in Telecommunications and sensor, by B.P. Pal, Wiley Eastern

5. Optical Fiber Communication by G. Kelser, McGraw Hill
6. Liu- Principles & Application of Optical Communication 1st ed., TMH
7. Ghatak- Optics 4th ed., TMH
8. Keiser- Optical Fiber Communication 4th ed., TMH

SEMESTER: VII

CATEGORY: EIEL

SUBJECT CODE: EI 72(A)

SUBJECT NAME: DIGITAL IMAGE PROCESSING

COURSE OBJECTIVE: [60Hrs]

Overview of digital image processing including visual perception, image formation, spatial transformations, image enhancement, color image representation and processing, edge detection, image segmentation, and morphological image processing.

UNIT-I[12Hrs]

Digital Image Processing- Elements of a Digital Image Processing system, Structure of the Human eye, Image formation and contrast sensitivity, Sampling and Quantization, Neighbours of a pixel, Distance measures, Photographic file structure and exposure, Filem characteristics, Linear scanner, Video camera, Image processing applications.

UNIT-II[12Hrs]

Image Transforms-Introduction to Fourier transform-DFT, Properties of two dimensional FT, Separability, Translation, Periodicity, Rotation, Average value, FFT algorithm, Walsh transform, Hadamard transform, Discrete Cosine transform.

UNIT-III[12Hrs]

Image Enhancement- Definition, Spatial domain methods, Frequency domain methods, Histogram modify technique, Neighborhood averaging, Media filtering, Lowpass filtering, Averaging of multiple images, Image sharpening by differentiation and high pass filtering.

UNIT-IV[12Hrs]

Image Restoration-Definition, Degradation model, Discrete formulation, Circulant matrices, Block circulant matrices, Effect of diagnolization of circulant and block circulant matrices, Unconstrained and constrained restorations , Inverse filtering, Wiener filter, Restoration in spatial domain.

UNIT-V[12Hrs]

Image Encoding-Objective and subjective fidelity criteria, Basic encoding process, The mapping, The quantizer, The coder, Differential encoding, Contour encoding, Run length encoding, Image encoding relative to fidelity criterion, Differential pulse code modulation.

COURSE OUTCOMES:

Students should demonstrate the ability: to acquire the fundamental concepts of a digital image processing system. It focuses on the theory and algorithms underlying a range of tasks including acquisition.

REFERENCES:

1. Rafael, C. Gonzlez., and Paul, Wintz, “Digital Image Processing”, Addison-Wesley Publishing
2. Company.
3. Jain Anil K., “Fundamentals of Digital Image Processing”, Prentice Hall.
4. Sosenfeld, and Kak, A.C., “Digital Image Processing”, Academic Press.
5. William K. Pratt., “Digital Image Processing”, John Wiley and Sons.

SEMESTER: VII

CATEGORY: EIEL

SUBJECT CODE: EI 72(B)

SUBJECT NAME: MANAGEMENT INFORMATION SYSTEM

COURSE OBJECTIVE: [60Hrs]

The main goals of Management Information System are to help executives of an organization make decisions that advance the organization's strategy and to implement the organizational structure and dynamics of the enterprise for the purpose of managing the organization in a better way for a competitive advantage.

UNIT-I[12Hrs]

The meaning and role of MIS

What is MIS, Decision support systems, systems approach, The systems view of business, MIS organization within the company. Management organizational theory and the systems approach: Development of organizational theory, Management and organizational behavior, Management information and the systems approach.

UNIT-II[12Hrs]

Information systems for decision-making:

Evolution of an information system, Basic information systems, Decision making and MIS, MIS as technique for making programmed decisions, design assisting information systems. Strategic and project planning for MIS General business planning, appropriate MIS response, MIS planning-general, MIS planning-details.

UNIT-III[12Hrs]

Conceptual System Design

Define the problems, Systems objectives, Establish system constraints, Determine information needs, Determine information sources, Develop alternative conceptual designs and select one, Document the system concept, Prepare the conceptual design report.

Detailed System Design

Information and involve the organization, arm of detailed design, Project management of MIS detailed design. Identify dominant and trade off criteria define the subsystems, Sketch the detailed operating MIS systems and information flows, Determine the degree of automation of each operation, inform and involve the organization again, Inputs, Outputs and processing, early system testing, Software, Hardware and tools, propose an organization to operate the system, Document the detailed design., Revisit the manager user.

UNIT-IV[12Hrs]

Implementation, Evaluation and Maintenance of the MIS

Plan the implementation, Acquire floor space and plan space layouts organized for implementation, Develop procedures for implementation, Train the operating personnel, Computer related acquisitions, Develop forms for data collection and information dissemination, Develop the files, Test the system, Cut over, Document the system, Evaluate the MIS, Control and maintain the system.

UNIT-V[12Hrs]

Pitfalls in MIS Development

Fundamental weaknesses, Soft spots in planning, Design problem, Implementation the TAR PITF.

COURSE OUTCOMES:

1. Describe the role of information technology and information systems in business
2. Record the current issues of information technology and relate those issues to the firm
3. Reproduce a working knowledge of concepts and terminology related to information technology
4. Appraise the knowledge previously acquired of Microsoft Office
5. Analyze how information technology impacts a firm
6. Interpret how to use information technology to solve business problems the impact of information systems in society

REFERENCES:-

1. Murdick R.G., Russ J.B., Clagget J.R., Information Systems for modern management. Effy OZ, Management Information Systems, 3rd edition, Thomson.
2. Jawadekar W.S., Management Information System.
3. Brien J.A.O., Irwin, Management Information Systems, McGraw Hill.
4. Dour's G.B., Olson M.H., Management Information Systems, 2nd edition, McGraw Hill.
5. Thireramp R.J., Decision Support Systems for Effective Planning and Control, PHI.
6. Sadagopan S., Management Information Systems, 4th edition, Prentice-Hall of India

SEMESTER: VII

CATEGORY: EIEL

SUBJECT CODE: EI 72(C)

SUBJECT NAME: ADVANCE INDUSTRIAL ELECTRONICS

COURSE OBJECTIVE: **[60Hrs]**

Give students an appreciation of the Power electronic circuits and their essential role for a whole array of consumer and industrial electronics products. At the low power end, these may include

switched-mode regulated power supplies for hand-held devices, TVs, light fittings, computers and other entertainment systems. At the high power end, there are diverse industrial applications in high voltage DC transmission, grid connections for wind generators and PV systems; Power supplies for telecommunication equipment, Power electronic converters for aircraft actuators and navigation, to name a few.

1. To ensure that students know some characteristic properties of Power
2. Electronics which covers steady-state characteristics of various DC-DC, DC-AC,
3. AC-DC and resonant converter circuits.
4. Developing the knowledge of Sensors and actuators which are important building
5. block of an industrial Process and shall be discussed to give an idea about the
6. excising possibilities and their usage.
7. Students will be taught the basics of PLC with ladder logic and how to deal with
8. input and output power electronic devices from analogue to digital field.

UNIT-I[12Hrs]

Introduction to modern power conductor devices: Gate turn off thyristor (GTO), Insulated Gate Bipolar Junction Transistor (IGBT), Power BJT, Power MOSFET, MOS controlled thyristor (MCT), Reverse conducting thyristor (RCT), Smart Power Devices (Power ICs) Rating, Static and dynamic characteristics, Safe operating areas, Protections of devices, Devices selection.

UNIT-II[12Hrs]

DC to DC conversion, Buck Boost and Buck Boost converters (Circuit Configuration and analysis with different types of loads) Power factor, Harmonics and effect of source inductance in converter circuits. Resonant DC, DC converters. Switched mode power supply (SMPS).

UNIT-III[12Hrs]

Concept of PWM in converters, UNITy power factor converters, Voltage source inverters (VSI), Current source inverters (CSI). Application of VSI and CSI in induction motor control.

UNIT-IV[12Hrs]

Non Drive applications of power electronics inverters, Uninterrupted power supply (UPS), Induction heating, Metal cutting, Active power line conditioning.

UNIT-V[12Hrs]

Vector controlled and slip power controlled induction motor drives, Application of microprocessor, Micro controllers and DSP in Machine drives.

COURSE OUTCOMES:

To apply the fundamental knowledge from Basic Electronics and circuit analysis to understand the working principle of power electronics.

1. To comprehensively understand the physics of semiconductors electronics.
2. To understand the physical basis and the use of typical industrial sensors.
3. To gain updated knowledge in the most advanced technique to interface and control electronic and electrical devices by using programmable logic controller.

REFERENCES:-

1. MH Rashid, Power Elex, PHI
2. J.G. Kassakian, MF Schlecht and G.C. Verghese "Principle of Power Electronics", Reading, MA, Addison Wesley.
3. Dubey G.K., " Power Semiconductor Controlled Drives", Engle Wood Cliffe NJ, Prentice Hall. DC Griffith, " Uninterruptible power supply", Marcell Dekker, NY.
4. P. Vas, "Vector control of AC motors", Oxford Press.

SEMESTER: VII

CATEGORY: EIEL

SUBJECT CODE: EI 73(A)

SUBJECT NAME: ANALYTICAL AND INDUSTRIAL INSTRUMENTATION

COURSE OBJECTIVE:
[60Hrs]

1. To introduce the basic concept of qualitative and quantitative analysis of a given sample.
2. To study various spectroscopic techniques and its instrumentation.
3. To study the concept of separation science and its applications.
4. To study the concept of industrial analyzers and its applications

UNIT I[12Hrs]

Difference between analytical and other instruments. Gas Analysis: Gas chromatography, Thermal conductivity method, Heat of reaction method. Estimation of oxygen, hydrogen, methane, carbon dioxide, CO, etc. in binary or complex gas mixtures. Zirconia-probe oxygen analyser. Paramagnetic oxygen meters, Electrochemical reaction method.

UNIT **II[12Hrs]**

Ultraviolet and visible spectrophotometry : Radiation sources, detectors, read outmodules, filters, monochromators. Instruments for absorption photometry. Fundamental laws of photometry. Infrared Spectrophotometry : Basic components of IR spectrophotometers, sample handling, Types of spectrophotometers, Fourier transform infrared spectroscopy.

UNIT III[12Hrs]

Mass spectrometry: Basic mass spectrometer, components of mass spectrometers, types of mass spectrometers resolution and applications. X-Ray methods. Production of X-Rays & X-Ray spectra, Instrumental UNITs, detectors for the measurement of radiation, direct X-Ray methods, X-Ray absorption methods, X-Ray fluorescence methods, X-Ray diffraction, Applications Spectroscopy, ESR Spectroscopy.

UNIT IV[12Hrs]

Chemical composition Analysis : Measurement of Viscosity, turbidity, metes consistency, pH and redox potential, electrical conductivity. Techniques of density measurement Solids, liquids

and gases.

UNIT V[12Hrs]

Environmental Pollution Monitoring Instruments : Air pollution monitoring instruments carbon monoxide, sulphur dioxide, Nitrogen oxides, Hydrocarbons, Ozone, Automated wet chemical air analysis. Water pollution monitoring instruments.

COURSE OUTCOMES:

1.The students get well versed with the principle, construction and working of various analytical instruments.

2. Students get detailed information about the applications of analytical techniques in medicine, industry etc.

SUGGESTED INSTRUCTIONAL STRATEGIES

1.Input cum discussions

2.Lab Work

3.Demonstration

4.Self study

5.Seminar/presentation

6.Mini project

LIST OF EXPERIMENTS

1. Study of Gas chromatograph .
2. Study of X-Ray Spectrometer .
3. Study of Ultraviolet & Visible Spectrophotometer.
4. Study of Mass spectrometer.
5. Viscosity measurement .
6. Turbidity measurement .

REFERENCES:

1. Patranabis D-Principles of Industrial Inst. TMH Publication

2. Merritt W H W, Dean LL and Settie JA - Instrumental Methods of Analysis. Skoog DA and West DM - Principles of Instrumental Analysis.
3. Hand book of Analytical Instrument Technology, Vol-11, Analysis Instruments, Butter worths Scientific Publication, London.

SEMESTER: VII

CATEGORY: EIEL

SUBJECT CODE: EI 73(B)

SUBJECT NAME: ROBOTICS

COURSE OBJECTIVE: [60Hrs]

1. To acquire the knowledge on advanced algebraic tools for the description of motion.
2. To develop the ability to analyze and design the motion for articulated systems.
3. To develop an ability to use software tools for analysis and design of robotic systems.

UNIT I [12 Hrs]

BASIC CONCEPTS: Definition and origin of robotics, different types of robotics. Various generations of robots, degrees of freedom, Asimov's laws of robotics, dynamic stabilization of robots

UNIT II [12Hrs]

POWER SOURCES AND SENSORS: Hydraulic, pneumatic and electric drives Determination of HP of motor and gearing: ratio, variable speed arrangements, path determination, micro machines in robotics Machine vision, ranging, laser, acoustic, magnetic, fiber optic and tactile sensors.

UNIT III [12Hrs]

MANIPULATORS, ACTUATORS AND GRIPPERS: Construction of manipulators , manipulator dynamics and force control Electronic andpneumatic manipulator control circuits , end effectors.

UNIT IV [12Hrs]

KINEMATICS AND PATH PLANNING: Solution of inverse kinematics problem Multiple solution Jacobian work envelop, hillclimbing techniques, Robot programming languages

UNIT V [12Hrs]

Manufacturing and non- manufacturing applications, robot cell design, selection of robot Robot Control: Linear methods, Non-linear methods

COURSE OUTCOMES:

1. Be able to use matrix algebra and Lie algebra for computing the kinematics of robots.
2. Be able to calculate the forward kinematics and inverse kinematics of serial and parallel robots.
3. Be able to calculate the Jacobian for serial and parallel robot.
4. Be able to do the path planning for a robotic system
5. Be proficient in the use of Maple or Matlab for the simulation of robots

REFERENCES:-

1. Mikell P. Weiss G.M., Nagel R.N., Odraj N.G. “Industrial Robotics”, McGraw-Hill Singapore, 1996

2. Ghosh, “Control in Robotics and Automation: Sensor Based Integration”, Allied Publishers, Chennai, 1998

3. Deb.S.R., “Robotics technology and flexible Automation”, John Wiley, USA 1992 4. Asfahl C.R., “Robots and manufacturing Automation”, John Wiley, USA 1992

LIST OF EXPERIMENTS

1. Study component of real robot and its DH parameter.
2. Study the Solution of inverse kinematics.
3. Implement path finding robot.
4. Study Solar Tracker robot.
5. Study robot cell design

SEMESTER: VII

CATEGORY: EIEL

SUBJECT CODE: EI 73(C)

SUBJECT NAME: SAFETY & RELIABILITY

COURSE OBJECTIVE: **[60Hrs]**

1.Describe several frameworks and theories for assessing and improving system safety

2.Describe key elements of published system safety and risk assessment studies

3.Understand how to develop a system safety plan

4.Recognize the extent of problems in system safety and risk assessment

5.Describe the role of various systems and factors in creating safety and in causing errors and adverse events

6.Discuss problems and issues in measuring and reporting safety

7.Demonstrate knowledge of the basics of conducting an incident or accident investigation

8.Design solutions to improve safety

9Understand the ethical, legal, and regulatory implications related to safety Compare the different types of instruments/methods available to assess system safety Critique the use of commonly used system safety and risk assessment techniques in specific applications.

UNIT-I [12Hrs]

Reliability and safety definitions, Risk factor, Classification of failures and protective measures. Safety measurement, Preliminary hazard analysis, Subsystem fault hazard analysis, Common mode failures, codes and standards for safety.

UNIT-II[12Hrs]

Reliability improvement Redundancy element, UNIT, and stand by optimization-cost trade off-Fault tree analysis Constructions of Fault tree-Calculations of reliability from fault tree-reliability allocation evaluation of reliability-test- O.C. curve specifying reliability acceptance test.

UNIT-III [12Hrs]

Definition of Quality-Quality control design-Product development cycle-Quality planning of manufacturing process-Process selection and control-Inspection and testing-Quality audit Organizing for quality-Quality function-Quality engineering and quality control-Typical organization for quality: Small scale, Medium scale and Large scale organization.

UNIT-IV [12Hrs]

Distribution, Markov modeling, Stress-strength approaches to reliability design, Relationship between MTBF, hazard rate, failure rate, reliability.

UNIT-V[12Hrs]

Redundancy techniques, examples from Electrical, Nuclear, Chemical and Process Engineering, Elementary Analysis and Estimation techniques.

References:

1. Jurian J.M., “Quality V Control Handbook”, McGraw Hill.

2. Grant E.L., & Levenworth, “Statistical Quality Control”, McGraw Hill.

3.Geedenko B.V., “Mathematical Methods of Reliability Theory”, Academic. Mann,

4.Schafer R.E., & Singapurvala N.D., “Mehods for Statistical Analysis of Reliability and Life Date”

5.Reigenbaum V., "Total Quality Control", McGraw Hill.

6.Trylot J.R., "Quality Control Systems-Procedures for Planning Quality Prog

COURSE OUTCOMES:

Many thinkers on this topic have identified core approaches. Some include behavior-based safety, a hazard and operability study (HAZOP) design for process safety, job safety analysis (JSA), and others.

This two-part series concentrates on:

1. Risk management

2. Conditions that are unsafe;

3. Contributors to accidents;

4. Specific safety for maintenance shops of all kinds.

List of Experiments

1. Study of Markov modeling

2. Study of reliability-test- O.C. curve specifying reliability acceptance test.

3. Study of cycle-Quality planning of manufacturing process-Process selection and control-Inspection.

4. Study of Markov modeling.

5. Study of Elementary Analysis and Estimation techniques

6. .Describe and discuss several frameworks and theories for assessing and improving system safety

7. To develop a system safety plan

8.Recognize the extent of problems in system safety and risk assessment

9.Study the role of various systems and factors in creating safety and in causing errors and adverse events

10.Demonstrate knowledge of the basics of conducting an incident or accident investigation and Design solutions to improve safety

9Understand the ethical, legal, and regulatory implications related to safety Compare the

different types of instruments/methods available to assess system safety Critique the use of commonly used system safety and risk assessment techniques in specific applications.

SEMESTER: VII

CATEGORY: OE

SUBJECT CODE: EI 74(A)

SUBJECT NAME: INTERNET OF THINGS

COURSE OBJECTIVE: **[60Hrs]**

Students will understand the concepts of Internet of Things and can able to build IoT applications.

1. They are also able to design & develop IOT Devices. Networks.
2. Able to understand building blocks of Internet of Things and characteristics.

UNIT-I[12Hrs]

Introduction to IoT Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs IoT & M2M Machine to Machine, Difference between IoT and M2M, Software define Network

UNIT-II[12Hrs]

Network & Communication aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.

UNIT-III[12Hrs]

Challenges in IoT Design challenges, Development challenges, Security challenges, Other challenges

UNIT-IV[12Hrs]

Domain specific applications of IoT Home automation, Industry applications, Surveillance applications, Other IoT applications

UNIT-V[12Hrs]

Developing IoTs Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python.

COURSE OUTCOMES:

1. Improve Efficiency. Data is the key to successfully improving productivity and operational efficiency with IoT solutions.
2. Gain Competitive Edge. A majority of surveyed executives say that IoT is a major contributor to their business. ...
3. Expand Your IoT View

REFERENCE BOOKS:

1. Vijay Madisetti, Arshdeep Bahga, “Internet of Things: A Hands-On Approach”

2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice

SEMESTER: VII

CATEGORY: OE

SUBJECT CODE: EI 74(B)

SUBJECT NAME: DIGITAL CONTROL SYSTEM

COURSE OBJECTIVE: **[60Hrs]**

1. To equipment the students with the basic knowledge of discretization.

2. To study the stability analysis of digital control system.
3. To study the canonical forms of digital control systems
4. To determine steady state performance of Digital control systems.
5. To design the controller and observer for digital control systems.
6. To study PID discrete controller

UNIT-I[12Hrs]

Modeling of Digital Control System Block diagram of sampled data / digital control system, Discrete LTI systems characterized by difference equations Sampling process and its frequency domain analysis, Idea sampler, Sampling theorem & Nyquist frequency, Data conversion techniques uses of A/D, D/A and ZOH elements.

UNIT-II[12Hrs]

Discrete System Modeling Definition and determination of the Z-plane and Z-transform, Mapping between S-plane and Z-plane, Z-transform theorems, The inverse Z-transform, Z-transform of system equations, Solution of linear difference equations using Z-transform, The pulse response, Block diagram reduction for systems interconnected through samplers, Signal flow graphs for hybrid systems.

UNIT-III[12Hrs]

Discrete Control Analysis Stability studies using Routh's test & Jury's test, Steady state error Analysis for stable systems, Root locus Analysis, Correlation between time Response & frequency response.

UNIT-IV[12Hrs]

Discrete Transform Analysis Folding / Aliasing, Transformation Methods between planes (s, z and w), Numerical solution differential, Equations, Jordon transformation, Backward forward & canonical difference, Pseudo continuous-time (PCT) Control system.

UNIT-V[12Hrs]

Discrete state Variable Analysis State variable representation, Time domain state and output equations for sampled data control system, State variable representation of a discrete time SISO system using phase variables - canonical variables - physical variables, State transition equation, State variable representation in the z-domain, System stability, Time response between sampling instants.

COURSE OUTCOMES:

The students will be able to

1. Understand mathematical models of linear discrete-time control systems using transfer functions and state-space models.
2. Analyze transient and steady-state behaviours of linear discrete time control systems.
3. Determine whether performance of linear discrete-time control systems meet specified design criteria.
4. Design controllers and observers for linear discrete-time control systems so that their performance meet specified design criteria.
5. Design PID controllers

REFERENCES:-

1. Kuo, “Digital Control System”, Oxford Press.
2. Ogata, “Digital Control System”, PHI.
3. Gopal M., “Digital Control System”, TMH.
4. Santina, Subberud and Hosteller, “Digital Control System Design”, Oxford University Press.
5. Chen, “Analog & Digital Control System Design, Oxford University Press.

SEMESTER: VII

CATEGORY: OE

SUBJECT CODE: EI 74(C)

SUBJECT NAME: MEMORY TECHNOLOGIES

60 HRS

COURSE OBJECTIVE

This is course deals with fundamental designing concepts of various memory technologies, techniques and architectures and alogorithms for modeling and testing the designed RAMs

UNIT 1: (10 HRS)

Random Access Memory Technologies: Static Random Access Memories (SRAMs), SRAM Cell Structures, MOS SRAM Architecture, MOS SRAM Cell and Peripheral Circuit, Bipolar SRAM, Advanced SRAM Architectures, Application Specific SRAMs.

UNIT 2: (10 HRS)

DRAMs, MOS DRAM Cell, BiCMOS DRAM, Error Failures in DRAM, Advanced DRAM Design and Architecture, Application Specific DRAMs.SRAM and DRAM Memory controllers.

UNIT 3: (10 HRS)

Non-Volatile Memories: Masked ROMs, PROMs, Bipolar & CMOS PROM, EEPROMs,Floating GateEPROM Cell, OTP EPROM, EEPROMs, Non-volatile SRAM, Flash Memories.

UNIT 4: (10 HRS)

Semiconductor Memory Reliability and Radiation Effects: General Reliability Issues, RAM Failure Modes and Mechanism, Nonvolatile Memory, Radiation Effects, SEP, Radiation HardeningTechniques. Process and Design Issues, Radiation Hardened Memory Characteristics, Radiation Hardness Assurance and Testing.

UNIT 5 : (10 HRS)

Advanced Memory Technologies and High-density Memory Packing Technologies: Ferroelectric Random Access Memories (FRAMs), Gallium Arsenide (GaAs) FRAMs, Analog Memories, Magneto Resistive Random Access Memories (MRAMs), Experimental Memory Devices.

UNIT 6: (10 HRS)

Memory Hybrids (2D & 3D), Memory Stacks, Memory Testing and Reliability Issues, Memory Cards, High Density Memory Packaging

COURSE OUTCOMES

At the end of this course student will demonstrate the ability to:

1. understand different memory technologies
2. understand theory fordesigning of different memory architectures and issues related
3. understand theoryforthe testing of designed memories and explore different algorithm level fault modelling

REFERENCES:

1. Ashok K Sharma, “Advanced Semiconductor Memories: Architectures, Designs and Applications”, Wiley Interscience
2. Kiyoo Itoh, “VLSI memory chip design”, Springer International Edition
3. Ashok K Sharma,” Semiconductor Memories: Technology, Testing and Reliability , PHI

SEMESTER: VI

CATEGORY: PROJECT

SUBJECT CODE: EI 75

SUBJECT NAME: MAJOR PROJECT –I

COURSE OBJECTIVE:
[60Hrs]

The object of Project Work I is to enable the student to take up investigative study in the broad field of Electronics & Communication Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:

1. Survey and study of published literature on the assigned topic;
2. Working out a preliminary Approach to the Problem relating to the assigned topic;
3. Conducting preliminary Analysis/Modelling/Simulation/Experiment/Design/Feasibility;
4. Preparing a Written Report on the Study conducted for presentation to the Department;
5. Final Seminar, as oral Presentation before a departmental committee.

The student should select a topic (from the subjects he has studied so far or any topic related to real life problem). He should do the literature survey, analyze the problem and propose some solution for the same. He should prepare a detailed (typed) report regarding the topic and should present the same with the help of power point presentation at the end of the semester. The analysis of the problem may be done with the help of some software or any hardware (which may be made by the student).

COURSE OUTCOMES:

1. Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study.
2. Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.
3. Use effectively oral, written and visual communication.

SEMESTER: VII

CATEGORY: HSMC

SUBJECT CODE: EI 76

SUBJECT NAME: OPERATIONS RESEARCH

COURSE OBJECTIVE:

[60Hrs]

This module aims to introduce students to use quantitive methods and techniques for effective decisions–making; model formulation and applications that are used in solving business decision problems. Course Components Introduction to Operations Research (OR)

• Introduction to Foundation mathematics and statistics

• Linear Programming (LP), LP and allocation of resources, LP definition, Linearity requirement

• Maximization Then Minimization problems.

• Graphical LP Minimization solution, Introduction, Simplex method definition, formulating the Simplex model.

• Linear Programming – Simplex Method for Maximizing.

• Simplex maximizing example for similar limitations, Mixed limitations

• Example containing mixed constraints, Minimization example for similar limitations.

• Sensitivity Analysis: Changes in Objective Function, Changes in RHS, The Transportation Model

• Basic Assumptions.

UNIT I[12Hrs]

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models

UNIT II[12Hrs]

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming

UNIT III[12Hrs]

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem –

UNIT IV[12Hrs]

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

UNIT V[12Hrs]

Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation

References:

1. H.A. Taha, Operations Research, An Introduction, PHI, 2008
2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.
3. J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008
4. Hitler Libermann Operations Research: McGraw Hill Pub. 2009
5. Pannerselvam, Operations Research: Prentice Hall of India 2010
6. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010

COURSE OUTCOMES:

1. Formulate and solve problems as networks and graphs.
2. Develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems.
3. Solve the problems using special solution algorithms.

SEMESTER: VIII

CATEGORY: PROJECT-III

SUBJECT CODE: EI 81

SUBJECT NAME: MAJOR PROJECT - 2/INTERNSHIP

COURSE OBJECTIVE: [60Hrs]

The student should prepare a working system or some system that he has selected from the previous semesters using system analysis tools and submit the same in the form of a write-up i.e. detail project report. The student should maintain proper documentation of different stages of project such as need analysis, market analysis, concept evaluation, requirement specification and test plan wherever applicable. Each student is the above points and presents the same at the final examination with a demonstration of the working system.

The student should prepare a working system or some design or understanding of a complex system that he has selected from the previous semesters using system analysis tools and submit the same in the form of a write-up i.e. detail project report. The student should maintain proper documentation of different stages of project such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan wherever applicable. Each student is required to prepare a project report based on the above points and present the same at the final examination with demonstration of the working system.

COURSE OUTCOMES:

1.Student interns will develop an understanding of their career field of interest, including the skills, responsibilities and career trajectory of professionals.

2.Student interns will develop analytical skills, including the ability to understand information and interpret data.